

Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report							
RSY Pad: RSY 11 Use 2				Soil Origin: TU-099B ESU			
Data attached and submitted by: Amy Mangel				Data Report Submittal Date: 02/02/2021			

Systematic Soil Sample Data: RSY 11 Use 2							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)
Project Remediation Goals*					1.861	0.141	0.331
HPPG-ESU-TU099B-001	1	Systematic	11,146	15,658	0.246	-0.0155	0.0115
HPPG-ESU-TU099B-002	2	Systematic	11,548	15,658	0.283	-0.0466	N/A
HPPG-ESU-TU099B-003	3	Systematic	11,501	15,658	0.226	0.0177	N/A
HPPG-ESU-TU099B-004	4	Systematic	11,719	15,658	0.306	-0.0660	N/A
HPPG-ESU-TU099B-005	5	Systematic	11,770	15,658	0.266	0.0411	N/A
HPPG-ESU-TU099B-006	6	Systematic	11,309	15,658	0.221	0.0134	N/A
HPPG-ESU-TU099B-007	7	Systematic	11,310	15,658	0.244	-0.0116	N/A
HPPG-ESU-TU099B-008	8	Systematic	11,329	15,658	0.0981	0.0300	N/A
HPPG-ESU-TU099B-009	9	Systematic	11,220	15,658	0.310	-0.0626	N/A
HPPG-ESU-TU099B-010	10	Systematic	11,627	15,658	0.141	0.0250	N/A
HPPG-ESU-TU099B-011	11	Systematic	11,739	15,658	0.353	0.00406	0.111
HPPG-ESU-TU099B-012	12	Systematic	11,938	15,658	0.151	-0.0201	N/A
HPPG-ESU-TU099B-013	13	Systematic	11,258	15,658	0.199	0.00718	N/A
HPPG-ESU-TU099B-014	14	Systematic	10,679	15,658	0.207	-0.00248	N/A
HPPG-ESU-TU099B-015	15	Systematic	10,486	15,658	0.200	-0.0164	N/A
HPPG-ESU-TU099B-016	16	Systematic	10,453	15,658	0.0454	0.00253	N/A
HPPG-ESU-TU099B-017	17	Systematic	12,296	15,658	0.390	0.0419	N/A
HPPG-ESU-TU099B-018	18	Systematic	11,438	15,658	0.269	-0.0421	N/A
HPPG-ESU-TU099B-019	19	Systematic	11,051	15,658	0.246	-0.0210	N/A
HPPG-ESU-TU099B-020	20	Systematic	11,259	15,658	0.148	0.00184	N/A
HPPG-ESU-TU099B-021	21	Systematic	10,601	15,658	0.205	0.00660	-0.162
HPPG-ESU-TU099B-022	22	Systematic	9,674	15,658	0.0936	-0.0116	N/A
HPPG-ESU-TU099B-023	23	Systematic	10,413	15,658	0.171	-0.00237	N/A
HPPG-ESU-TU099B-024	24	Systematic	11,621	15,658	0.105	-0.0187	N/A
HPPG-ESU-TU099B-025	25	Systematic	11,490	15,658	0.235	-0.0186	N/A
Soil Systematic Sample Statistics					²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)
					Maximum	0.390	0.0419
					Mean	0.2144	-0.0066
					Median	0.221	-0.0025
					Minimum	0.0454	-0.0660
					Standard Deviation	0.0833	0.0282
							N/A

Biased Soil Sample Data: RSY 11 Use 2							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 NaI Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)
Project Remediation Goals*					1.861	0.141	0.331
HPPG-ESU-TU099B-B-001	1	Biased	12,446	15,658	0.334	0.0433	0.0586

CPM Counts per minute

pCi/g Picocuries per gram

* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-12042020-PG-ROV-379	12/04/2020	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-12042020-PG-JSS-380	12/04/2020	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-12052020-PG-JSS-381	12/05/2020	3x3	08/06/2021	108853
Biased Sample Survey	HPRS-12052020-PG-JSS-381	12/05/2020	3x3	08/06/2021	108853

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 11 Use 2
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 31 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 31 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-44. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 45-80). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for ⁸⁷ Sr. Strontium-90 results are also included in the TestAmerica sample results report (pages 67-102). Samples HPPG-F-053 and HPPG-F-054 are field duplicates, correlating to systematic samples -018 and -021. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project. The Instrument and Survey Summary table above lists the 3x3 NaI detector used for the gamma static measurements collected during sampling activities, and the instrument-specific gamma static IL listed in the sample tables on page one is developed from that instrument's RBA data.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1 and 3.4.1, one biased sample was collected since all follow-up static measurements were below the ROC-specific critical levels. The biased sample was collected from the location of the highest gross gamma scan measurement. TestAmerica sample results are attached (pages 45-80). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
Conclusions: In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background. RSY 11 Use 2 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-099B ESU. APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-099.

Soil Scan Statistics

Statistical Summary

Dataset	PG-RSY-11-U2					
	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		5.01	32.07	16.82	17.03	4.20
ROI-06		61.11	146.32	99.62	99.23	11.72
ROI-07		40.08	115.24	75.74	75.17	9.87
ROI-08		77.18	174.38	124.90	125.25	13.24
ROI-10		2,055.86	3,017.85	2,531.54	2,542.32	133.17

Statistical Summary Reference Background

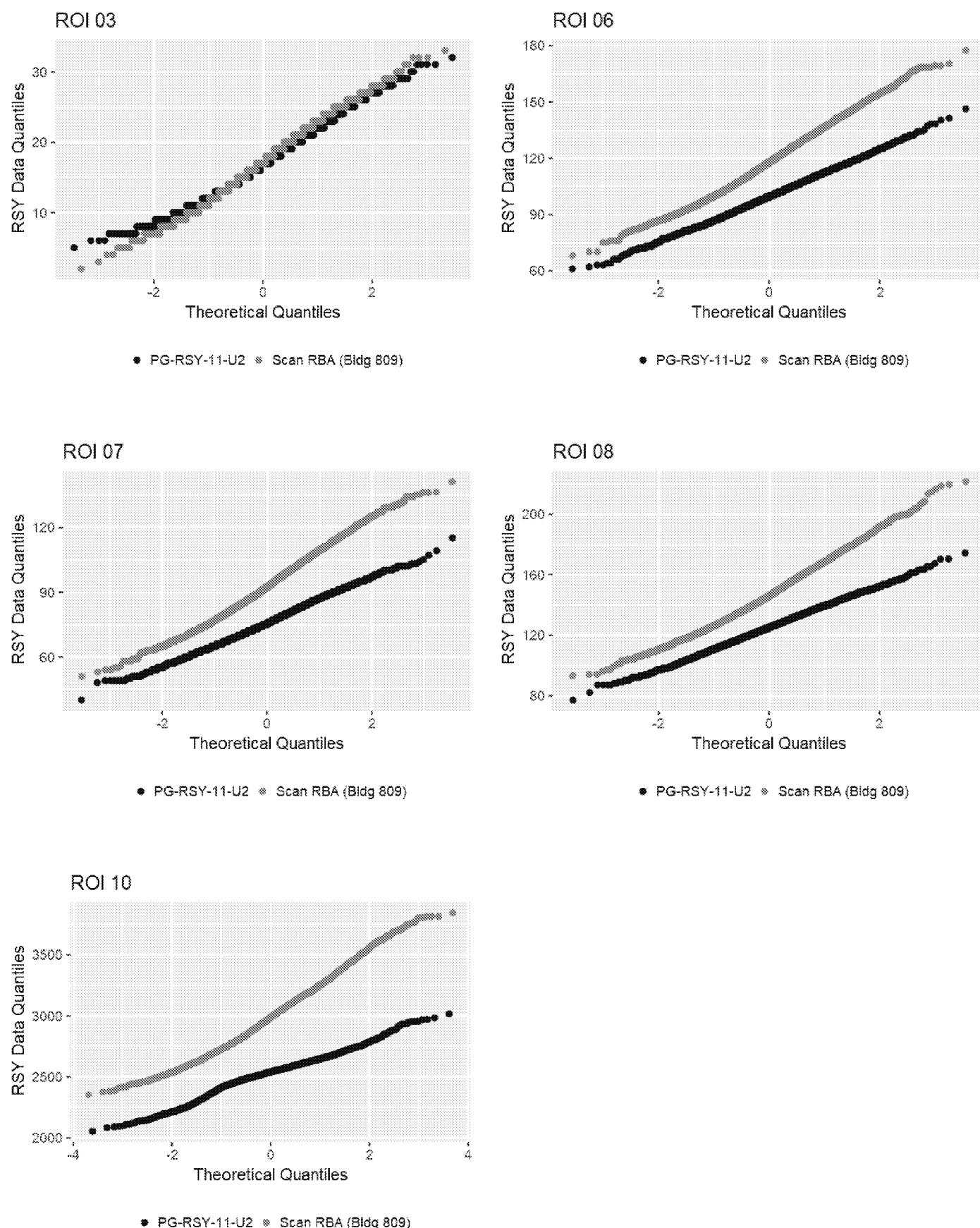
TYPE	Scan RBA (Bldg 809)					
	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		2.00	33.08	16.21	16.04	4.13
ROI-06		68.15	177.45	117.58	117.26	15.50
ROI-07		51.11	141.33	92.34	91.24	13.43
ROI-08		93.19	221.48	146.24	145.30	18.21
ROI-10		2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-11-U2	3326
Scan RBA (Bldg 809)	4632

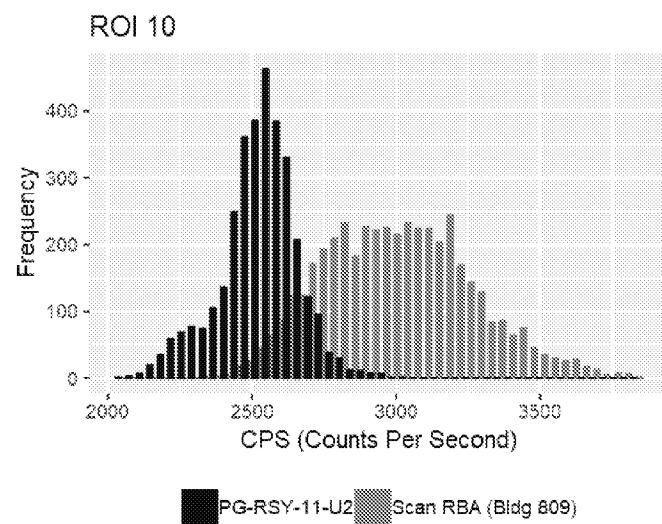
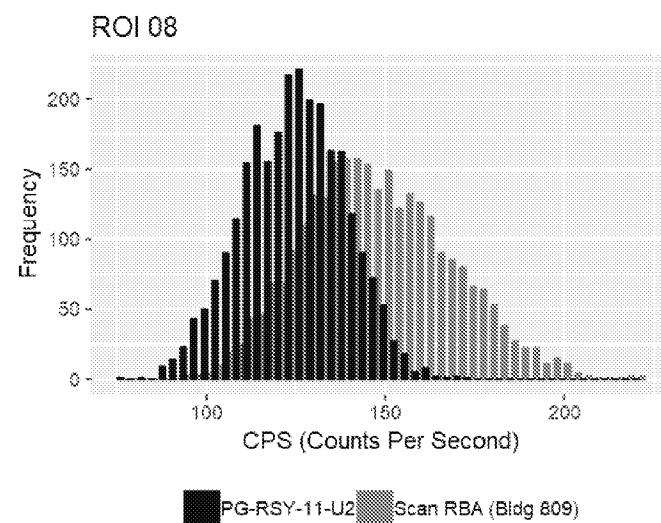
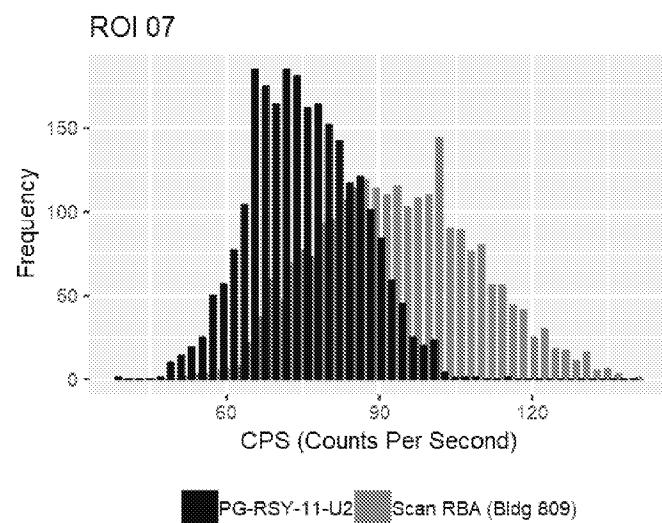
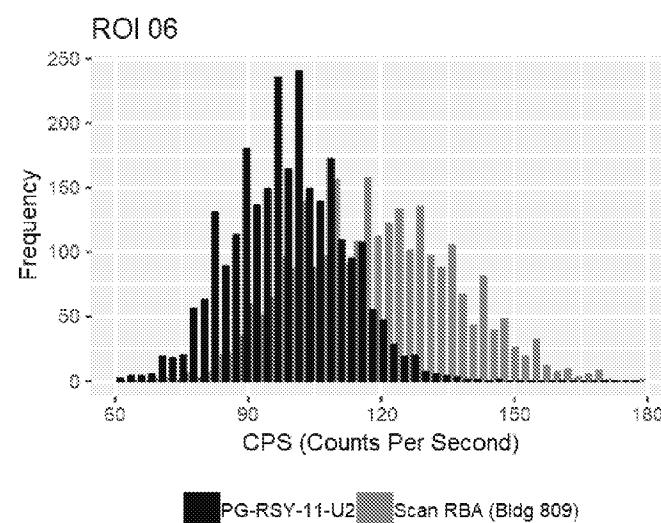
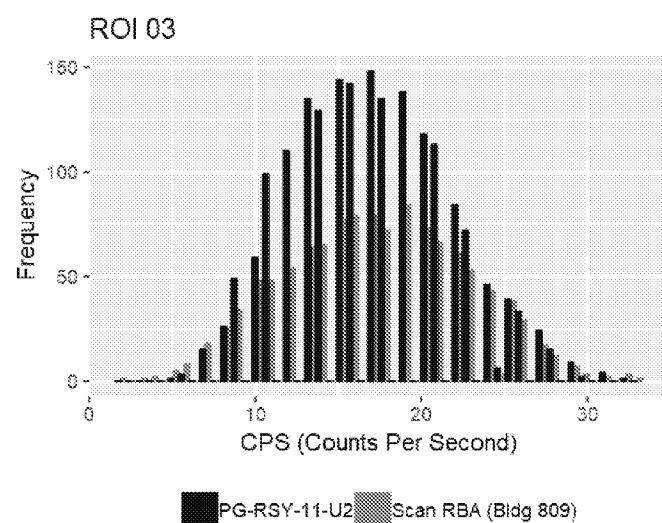
Soil Scan Statistics

Normal Q-Q Plots



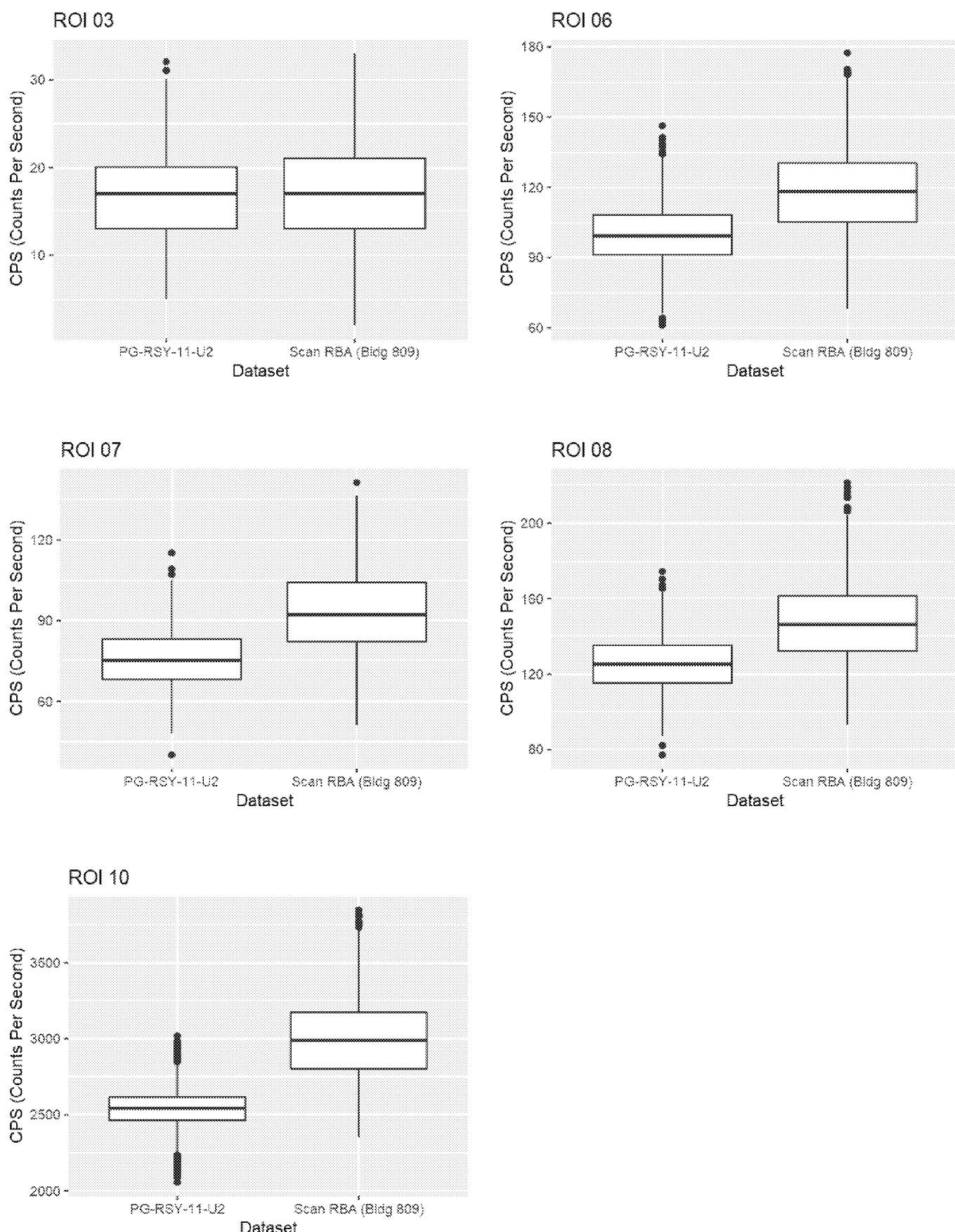
Soil Scan Statistics

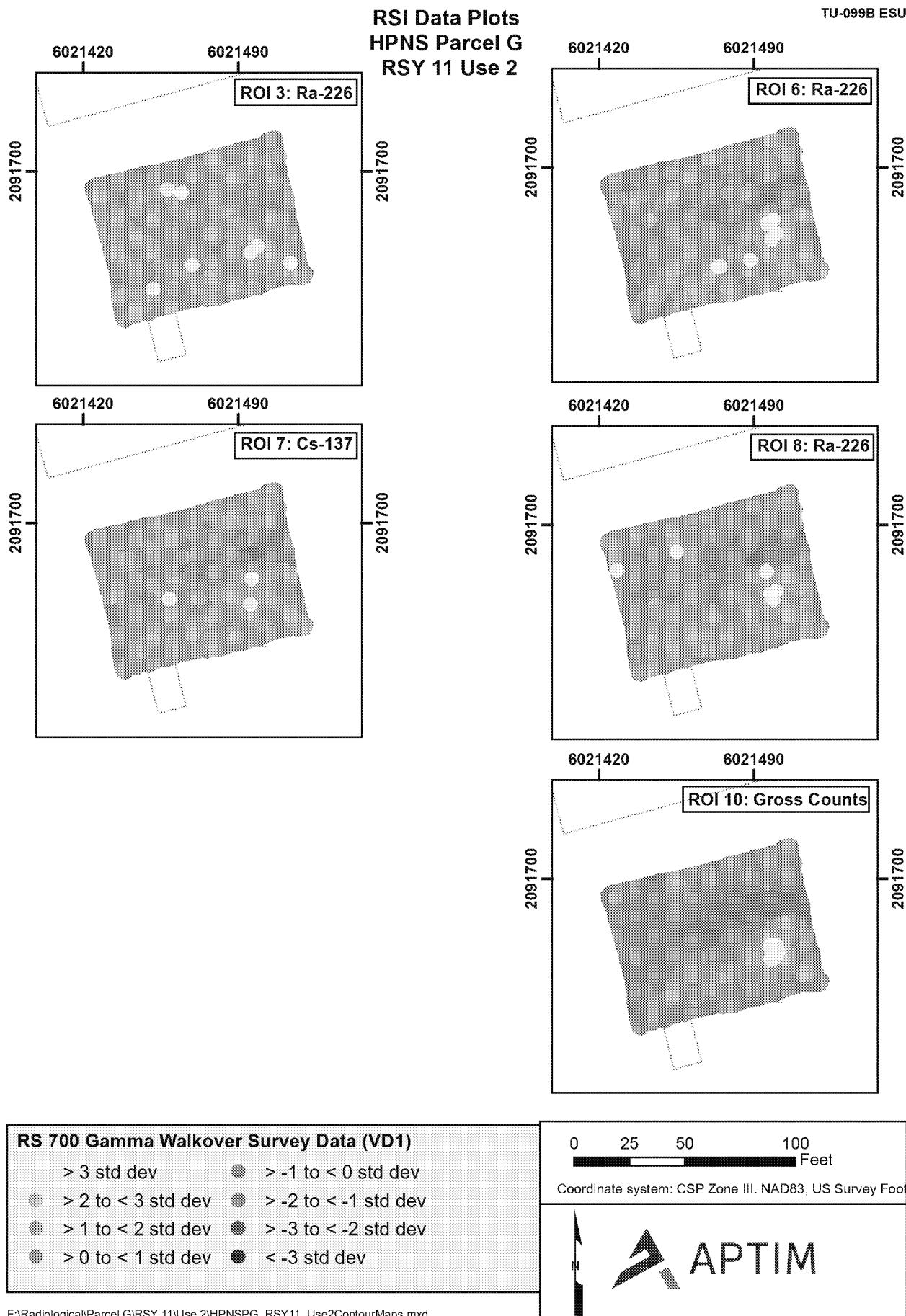
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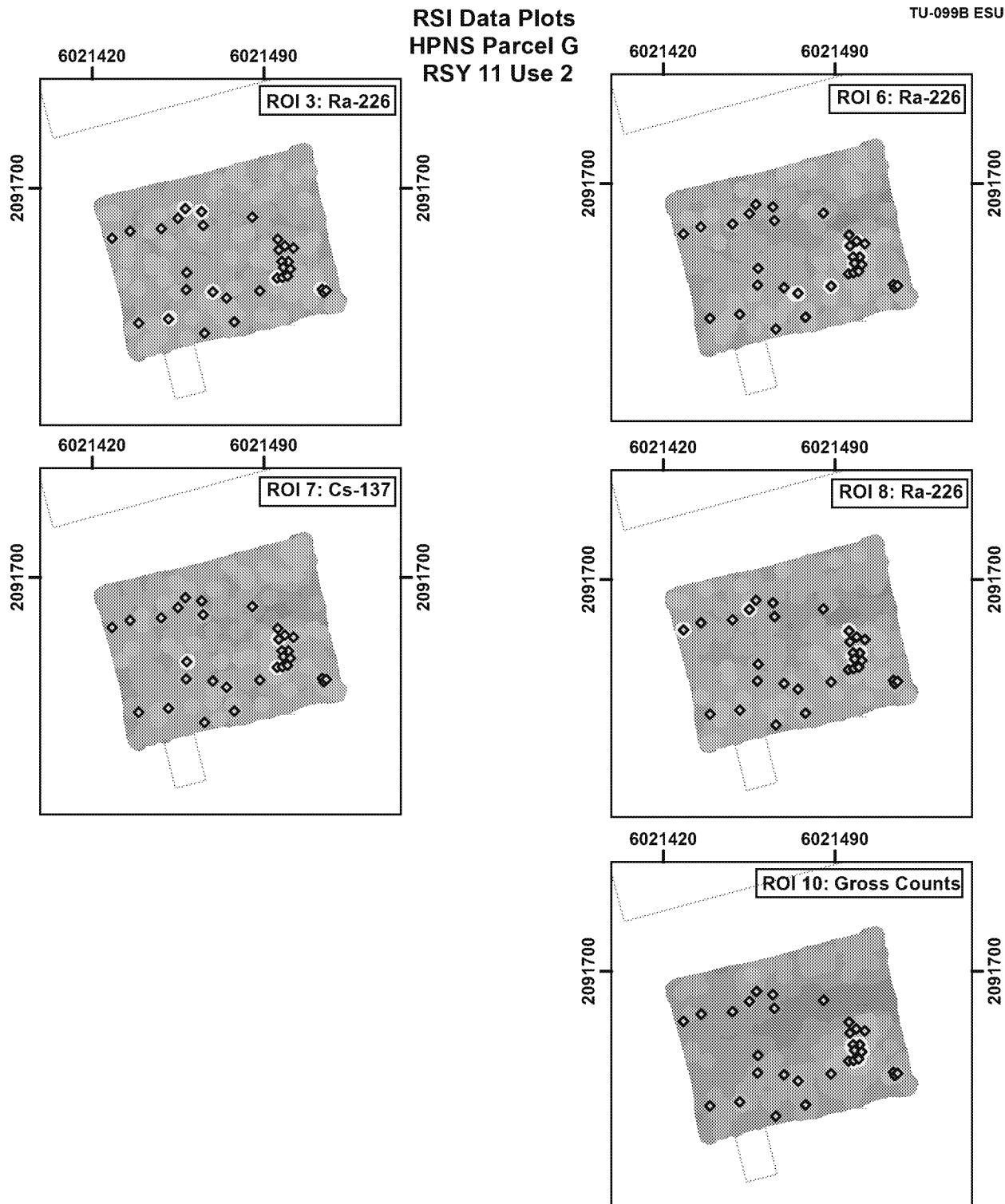


Soil Scan Statistics

Box Plots







RS 700 Gamma Walkover Survey Data (VD1)

- ◆ Follow-Up Location
- > -1 to < 0 std dev
- > 3 std dev
- > -2 to < -1 std dev
- > 2 to < 3 std dev
- > -3 to < -2 std dev
- > 1 to < 2 std dev
- < -3 std dev
- > 0 to < 1 std dev

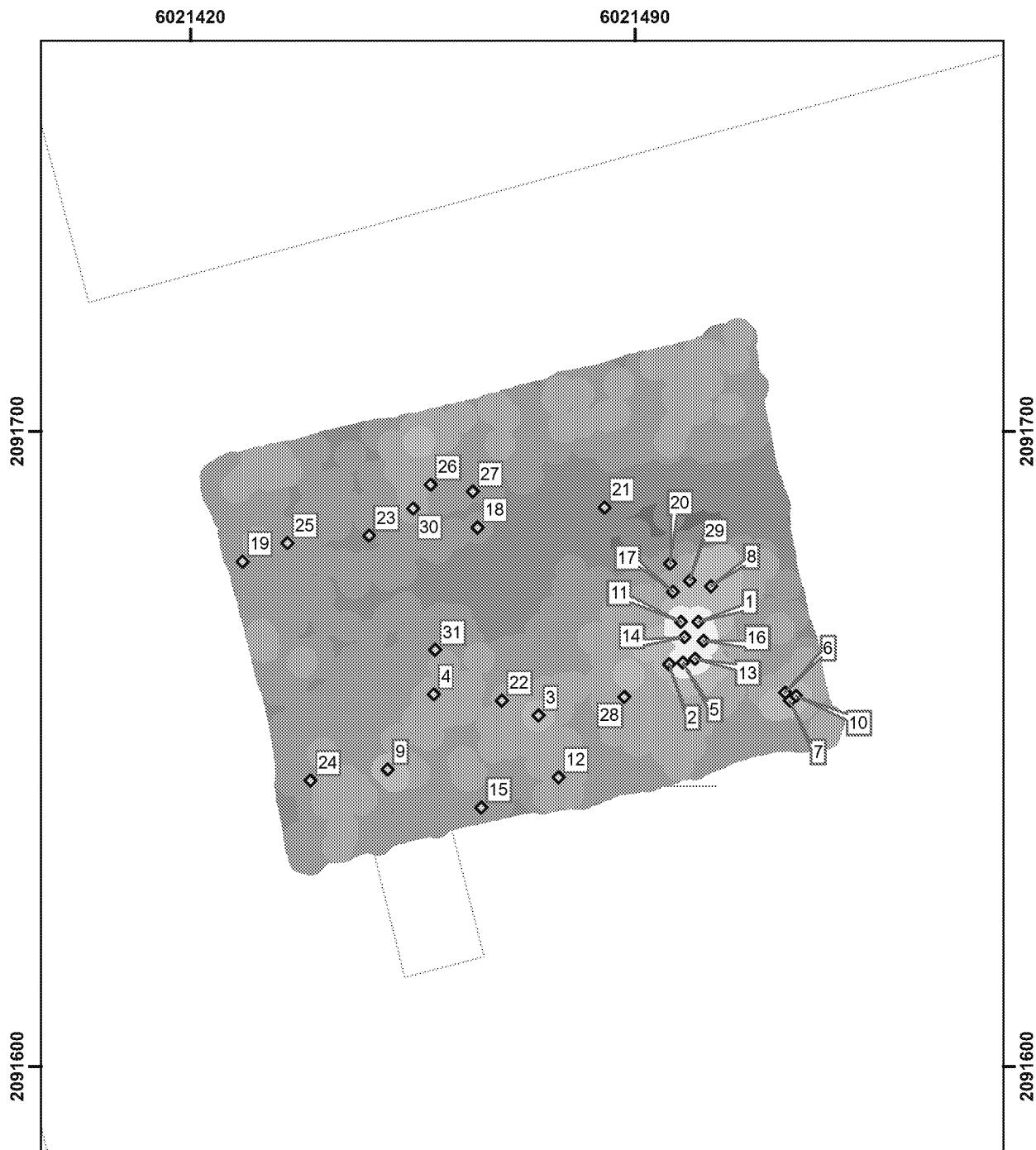
0 25 50 100
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**Follow-Up Static Survey
HPNS Parcel G
RSY 11 Use 2**

TU-099B ESU



RSY 11 Use 2 (VD1, ROI 10 Gross Gamma)

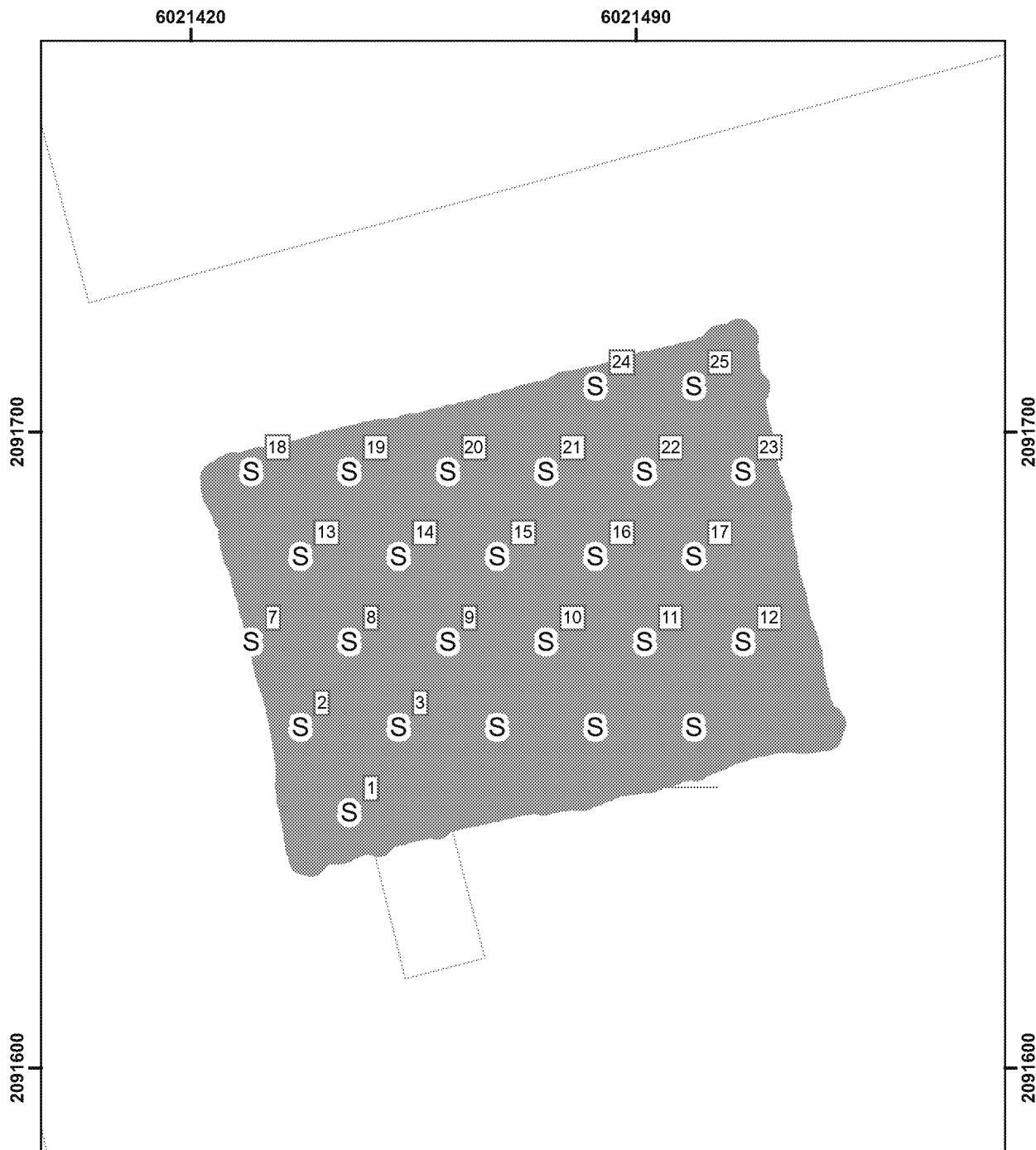
- ◆ Follow-Up Locations
- > 1 to < 2 std dev
- > -2 to < -1 std dev
- > 3 std dev
- > 0 to < 1 std dev
- > -3 to < -2 std dev
- > 2 to < 3 std dev
- > -1 to < 0 std dev
- < -3 std dev

20 10 0 20 Feet
Coordinate system: CSP Zone III. NAD83, US Survey Foot



Systematic Sampling
HPNS Parcel G
RSY 11 Use 2

TU-099B ESU



RSY 11 Use 2

S Systematic Sample Locations

RS-700 GWS Coverage

20 10 0 20 Feet

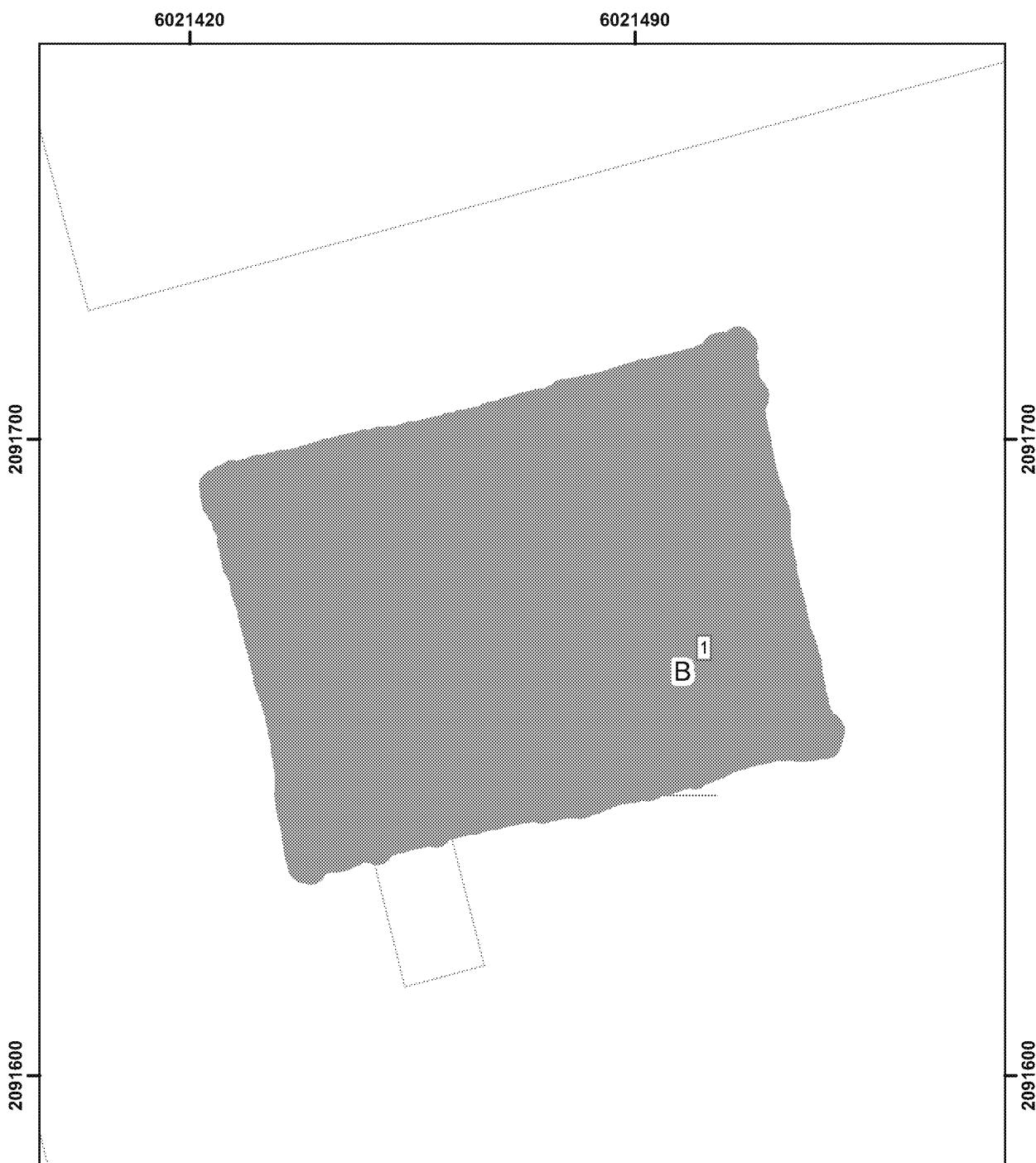
Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

Biased Sampling
HPNS Parcel G
RSY 11 Use 2

TU-099B ESU



RSY 11 Use 2

B Biased Sample Location

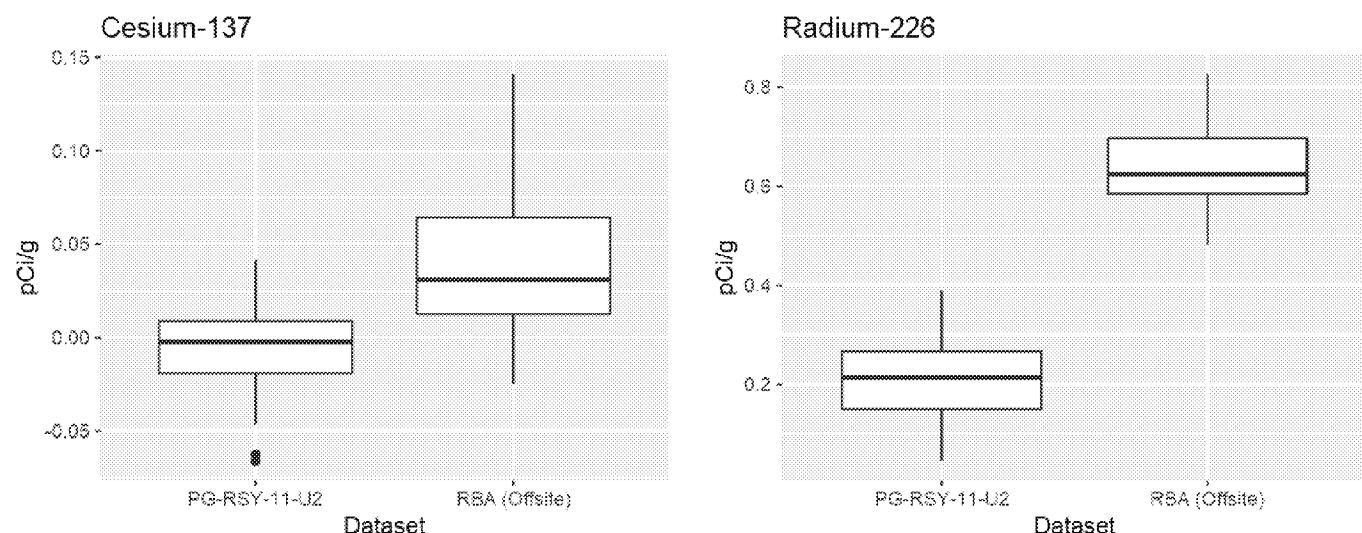
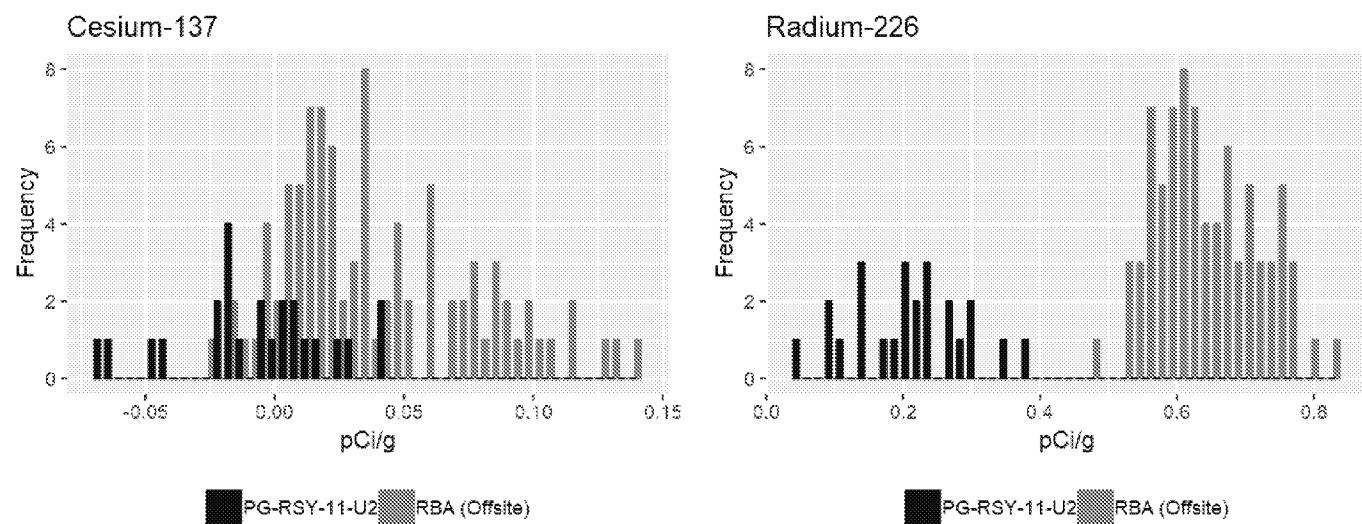
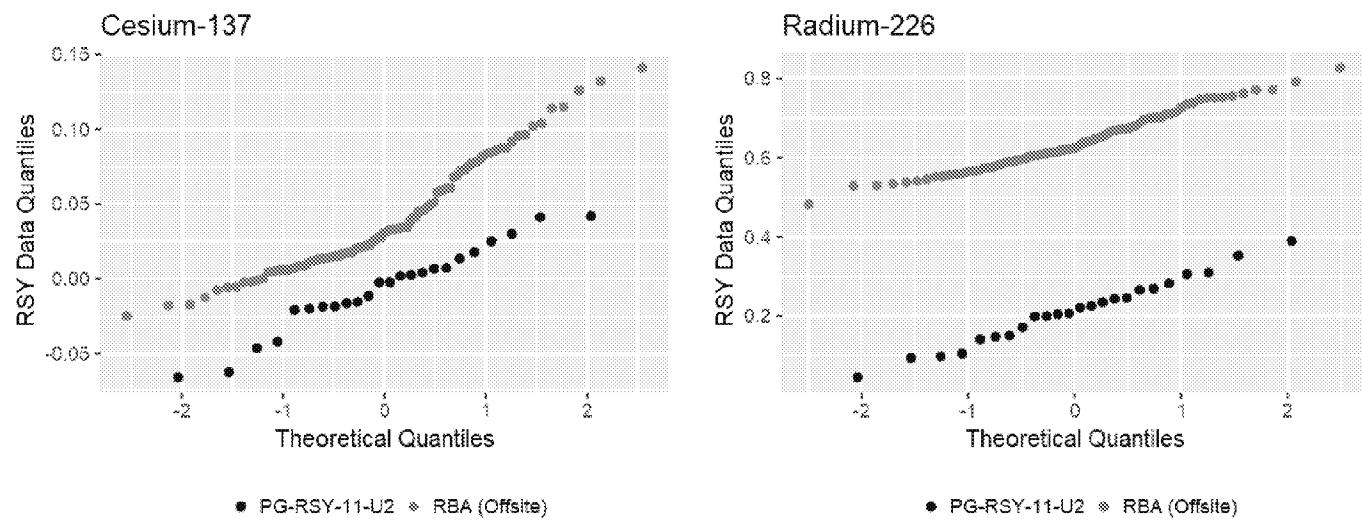
● RS-700 GWS Coverage

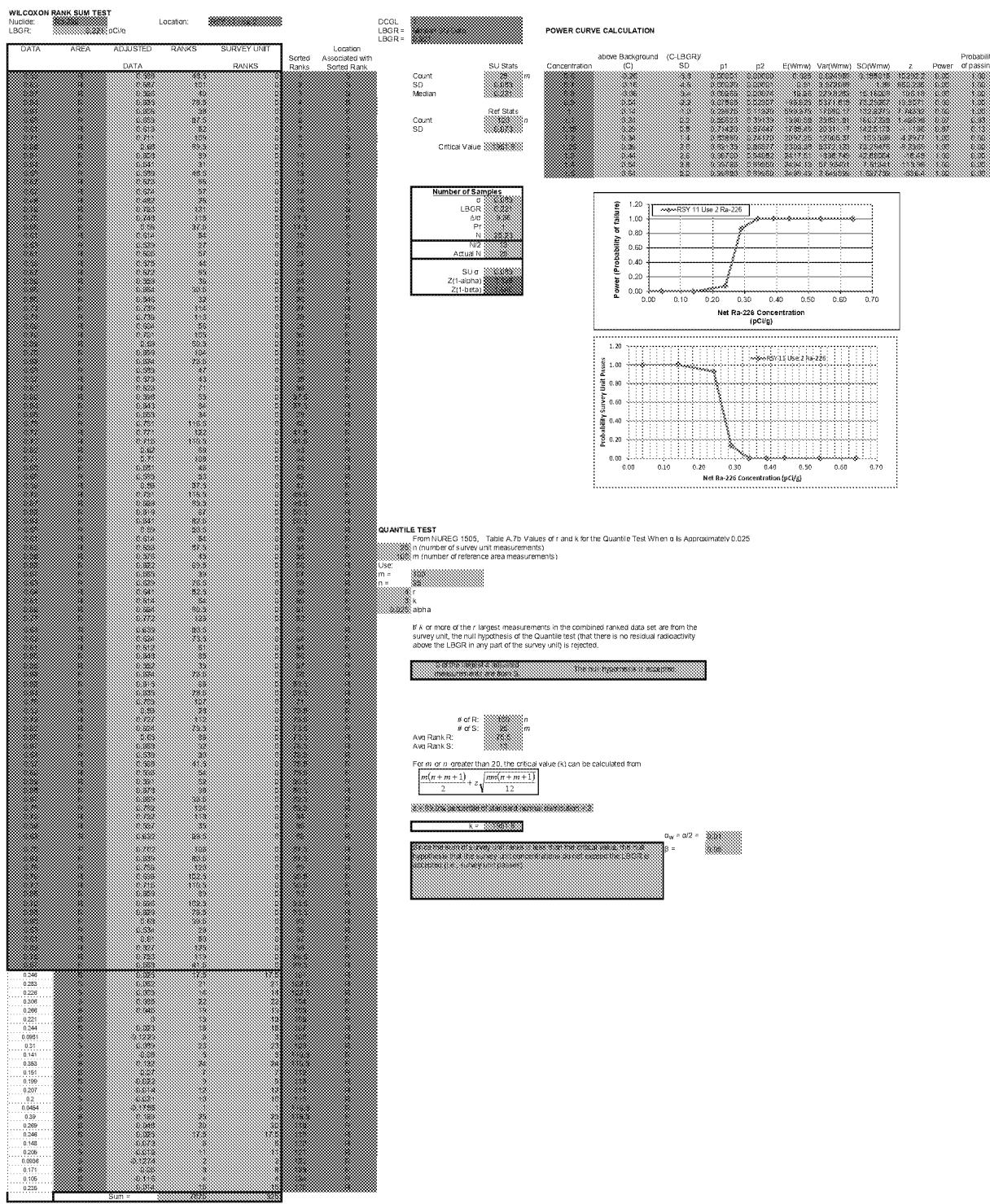
20 10 0 20 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



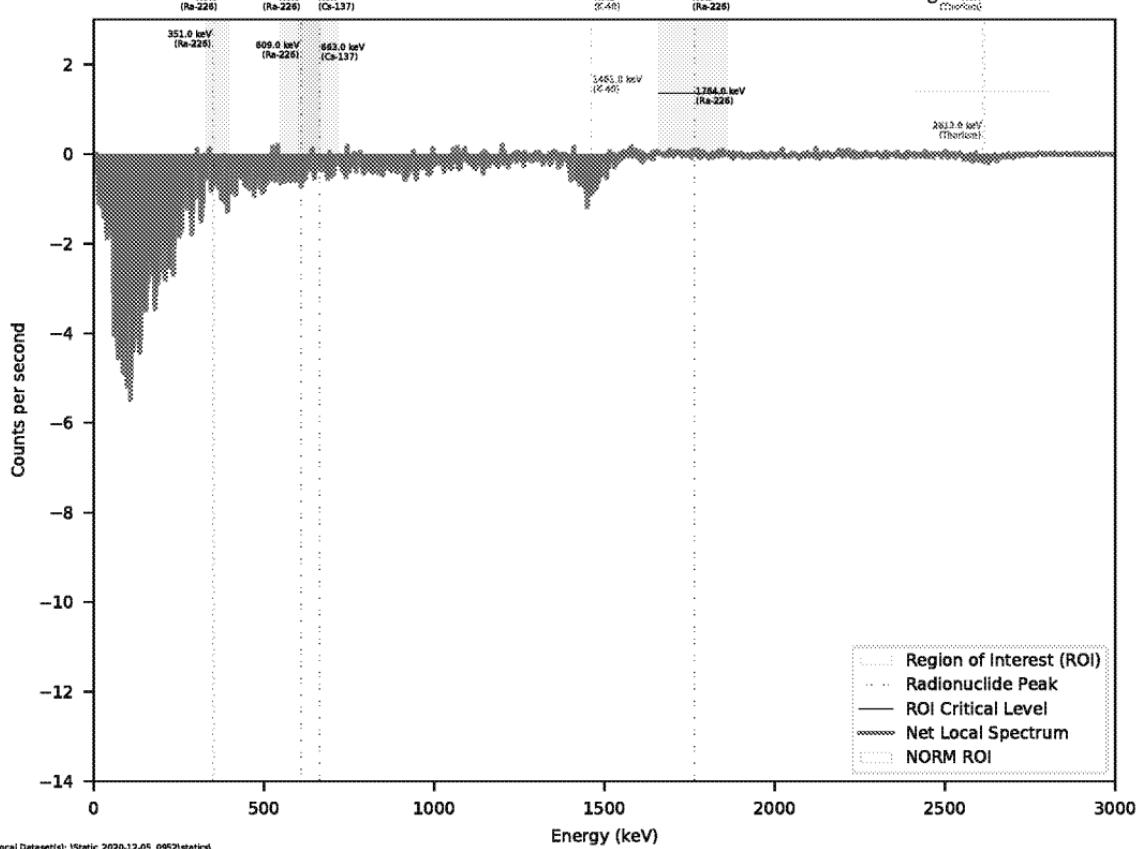
Soil Sample Statistics





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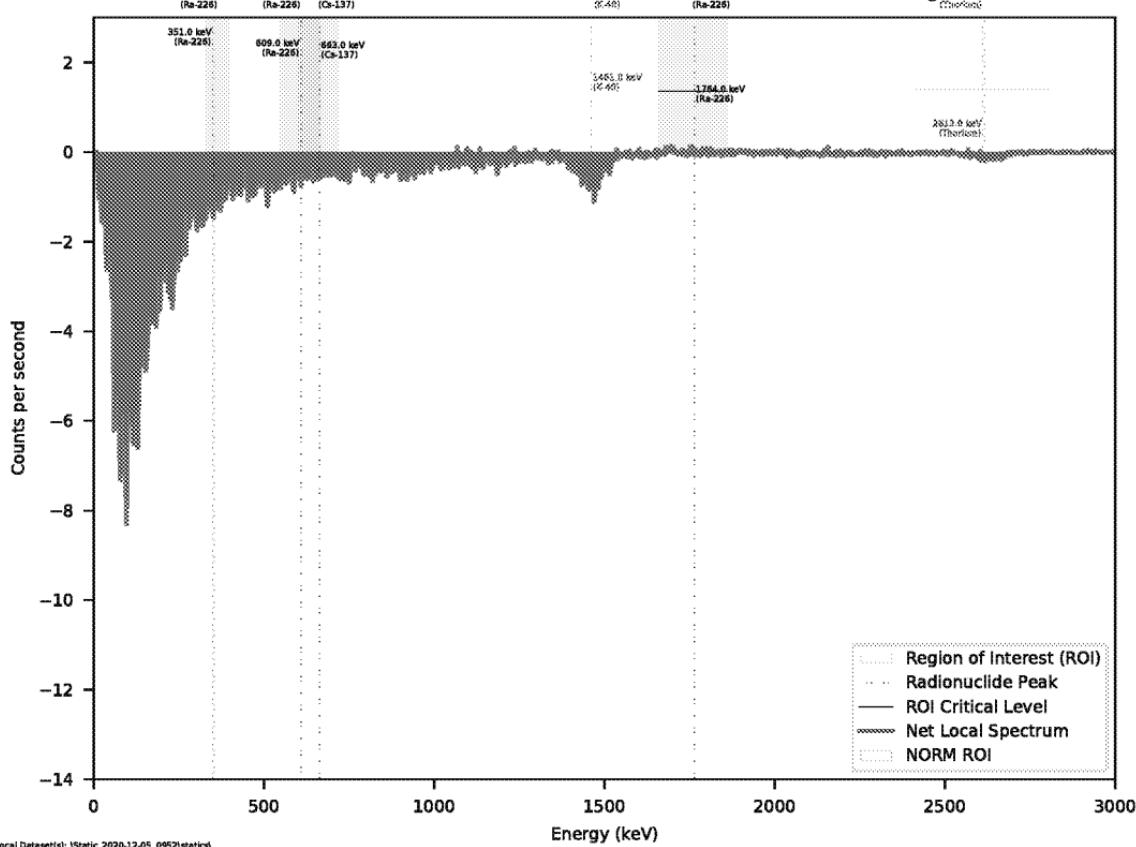
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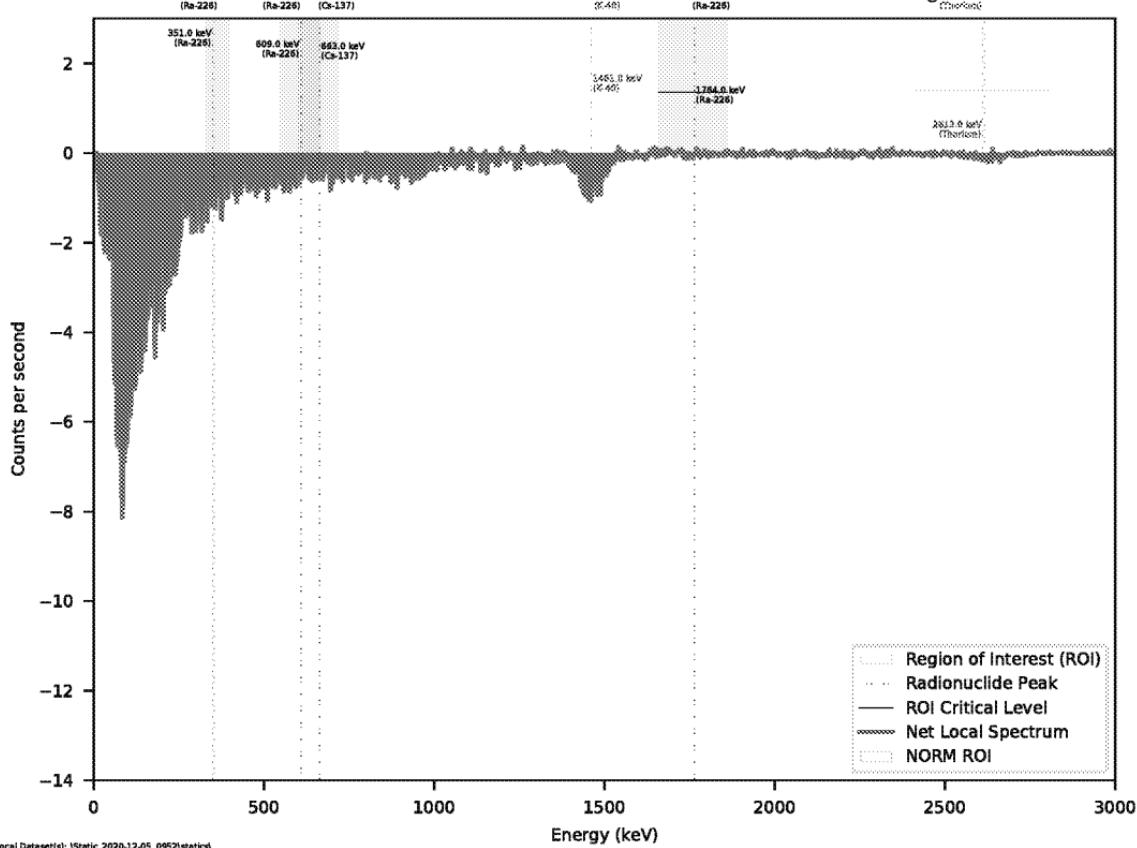
Net Gamma Spectrum, Static Location: 2

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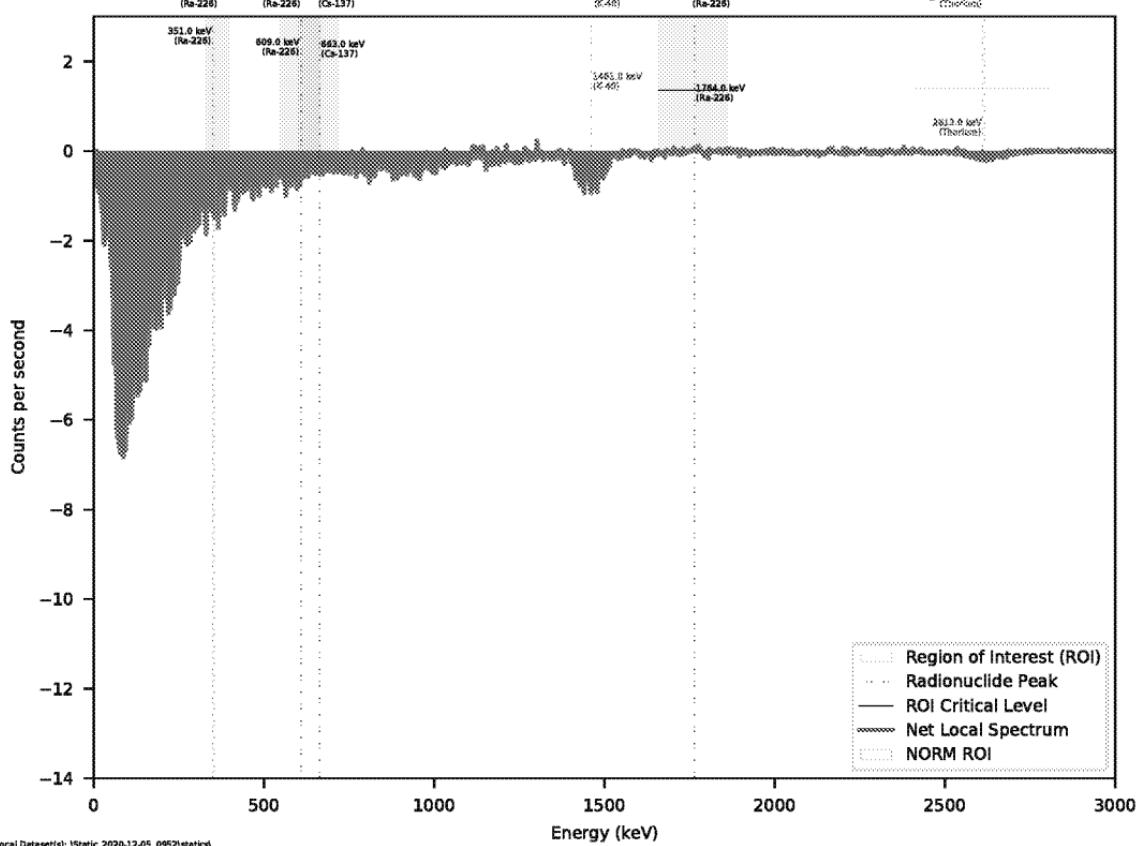
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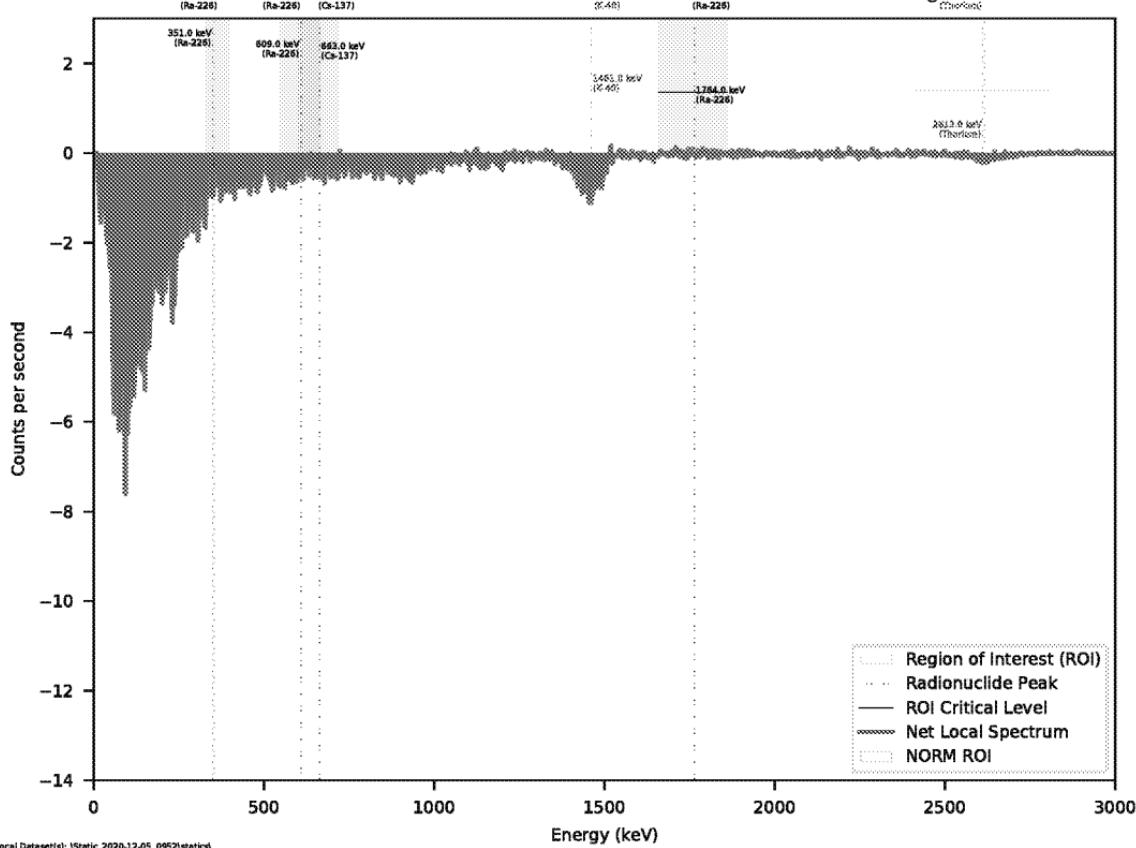
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Net Gamma Spectrum, Static Location: 5

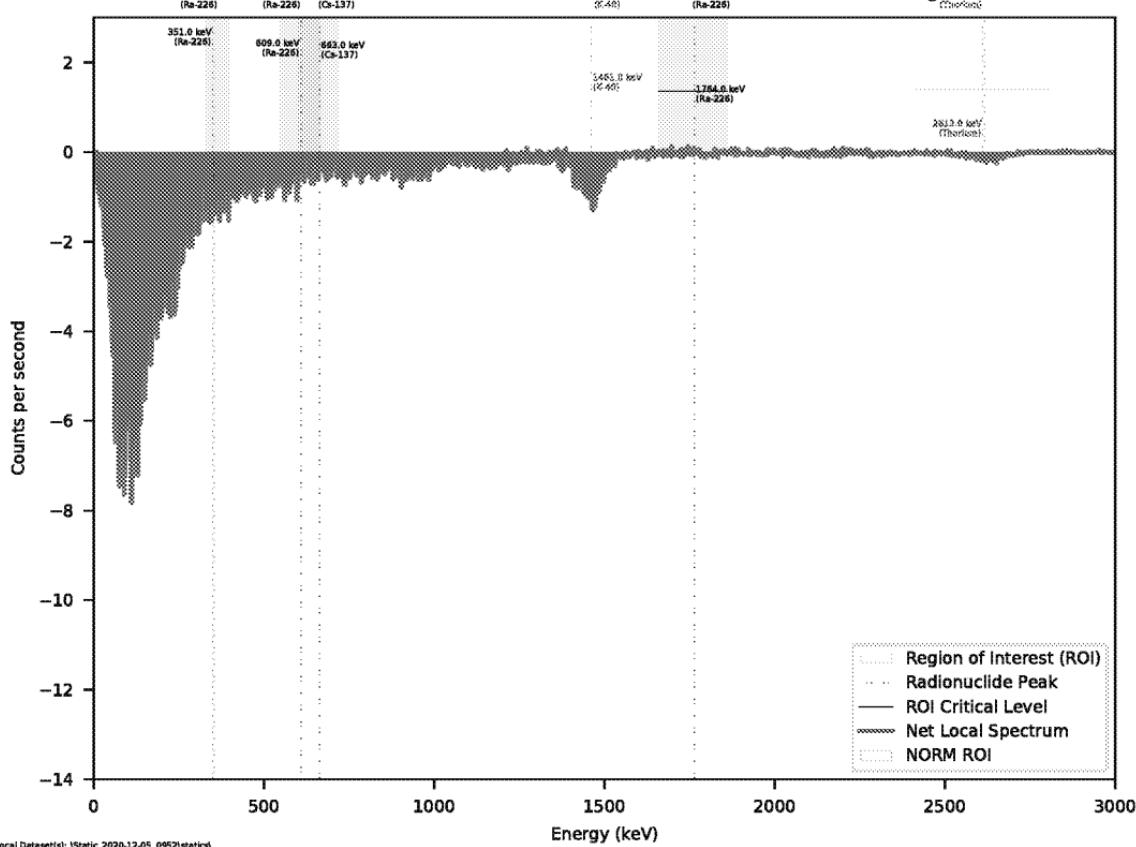
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Net Gamma Spectrum, Static Location: 6

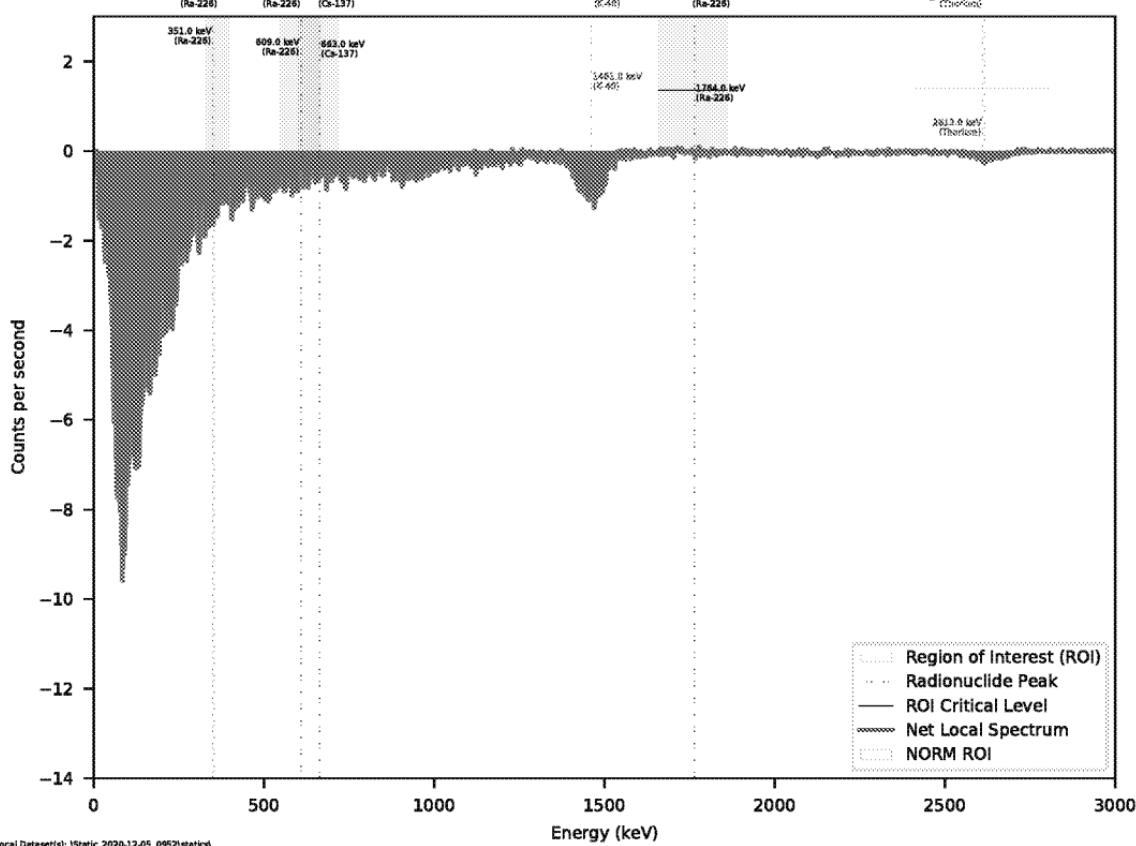
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Net Gamma Spectrum, Static Location: 7

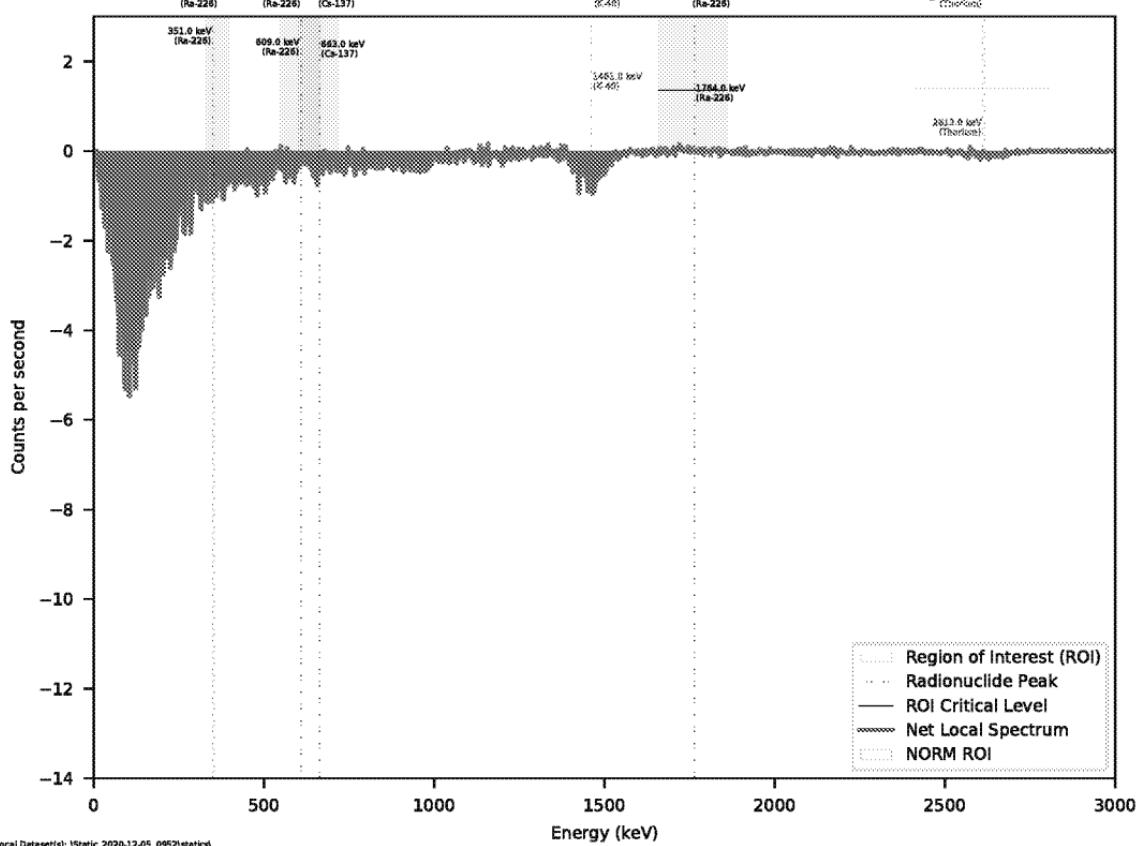
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Net Gamma Spectrum, Static Location: 8

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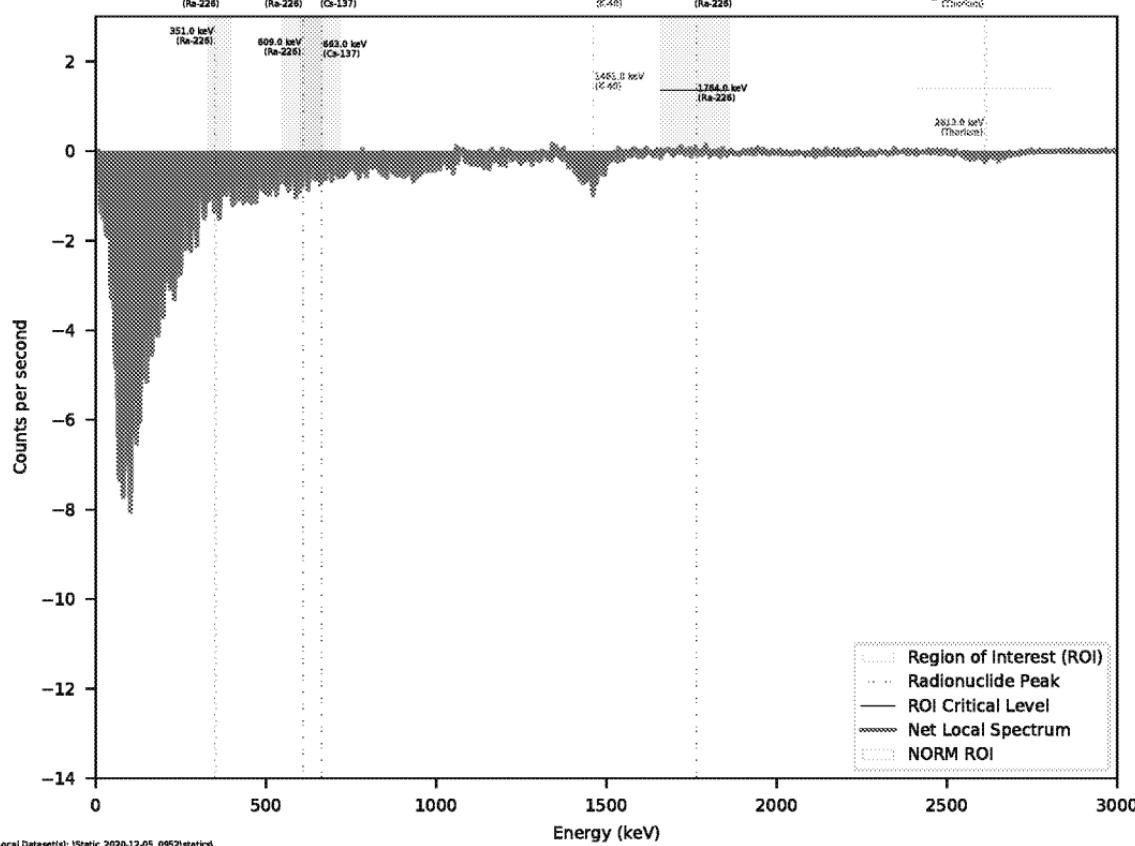
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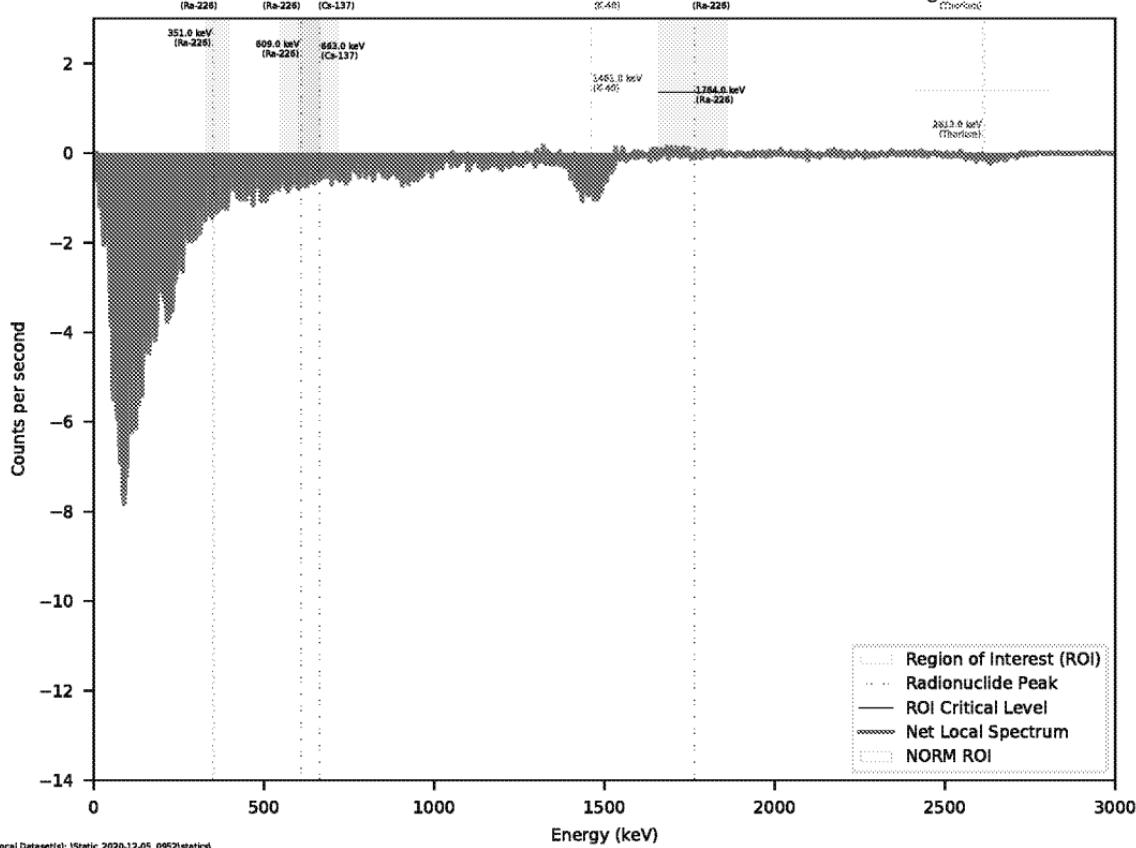
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Net Gamma Spectrum, Static Location: 10

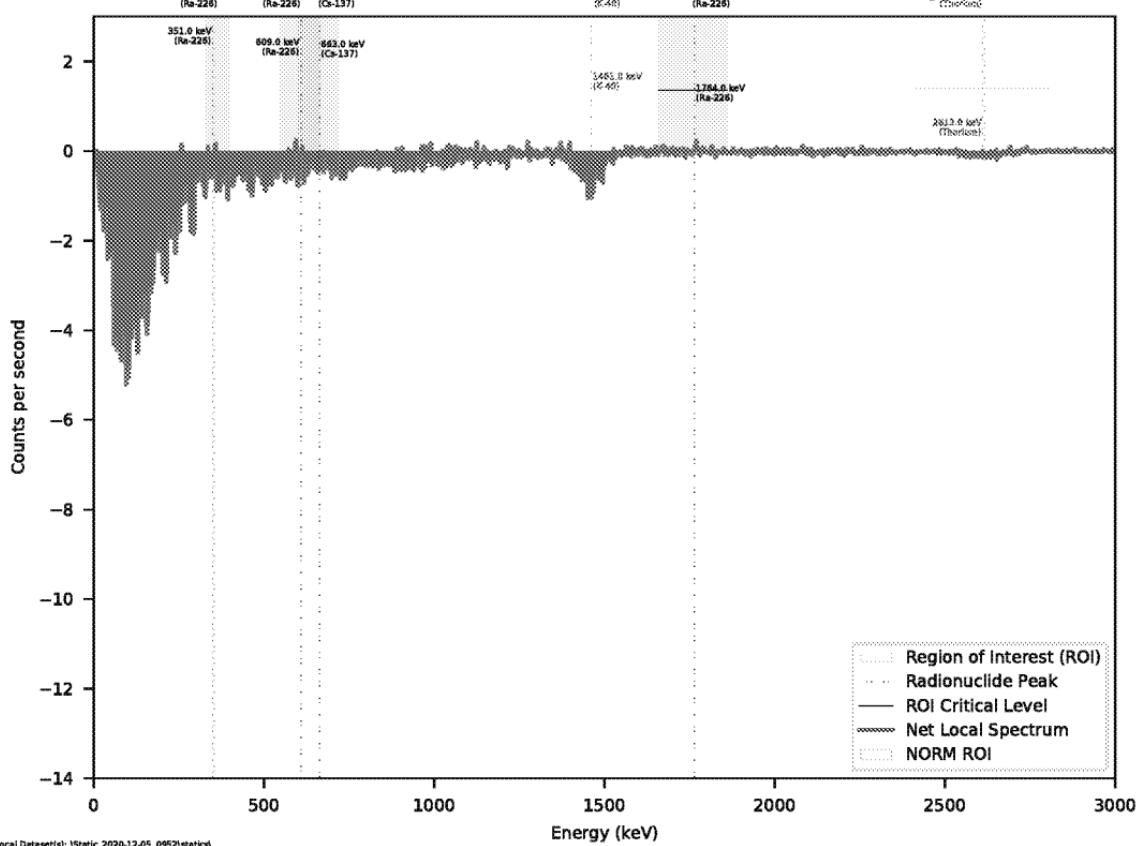
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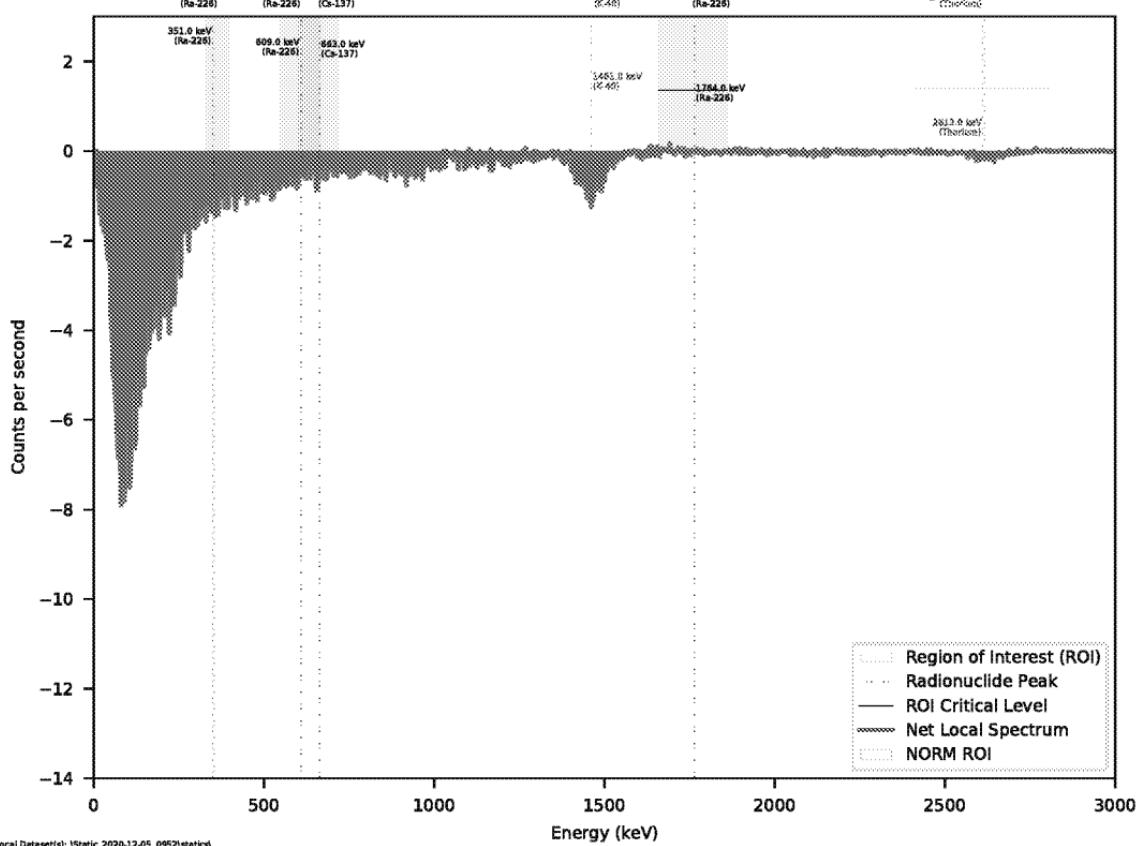
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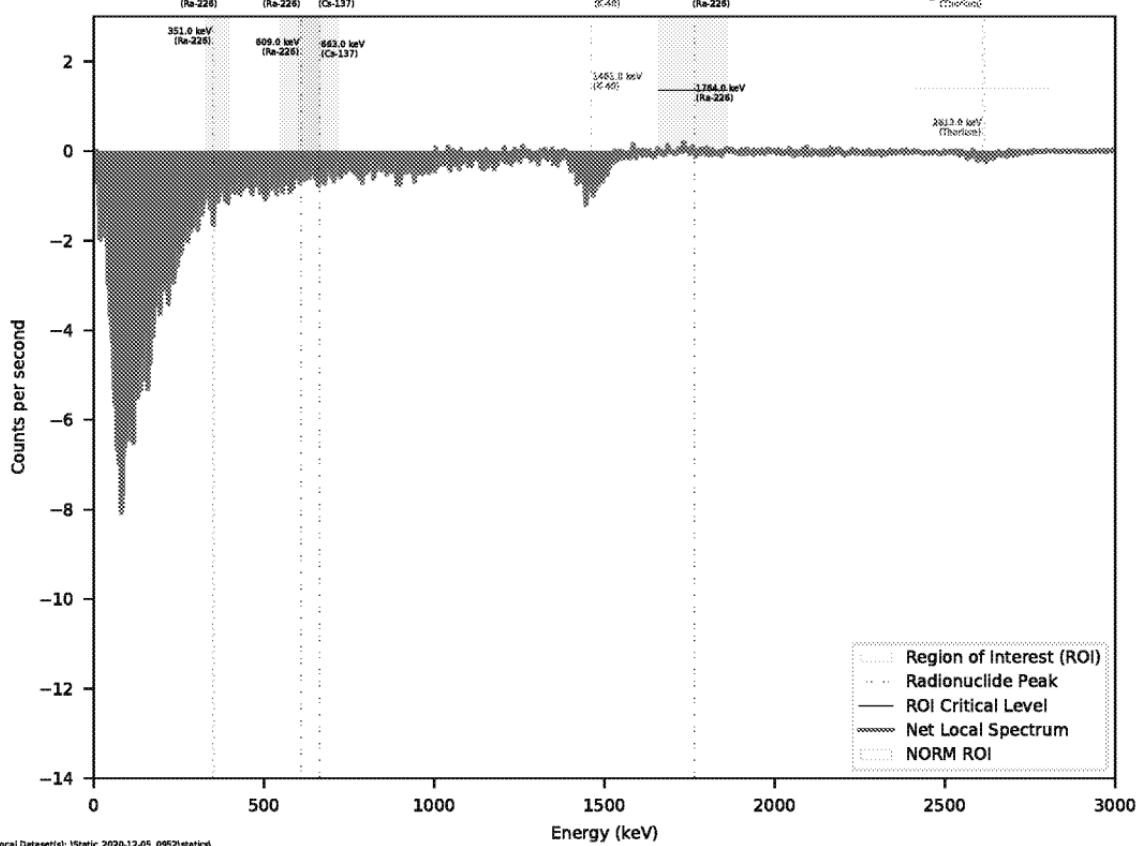
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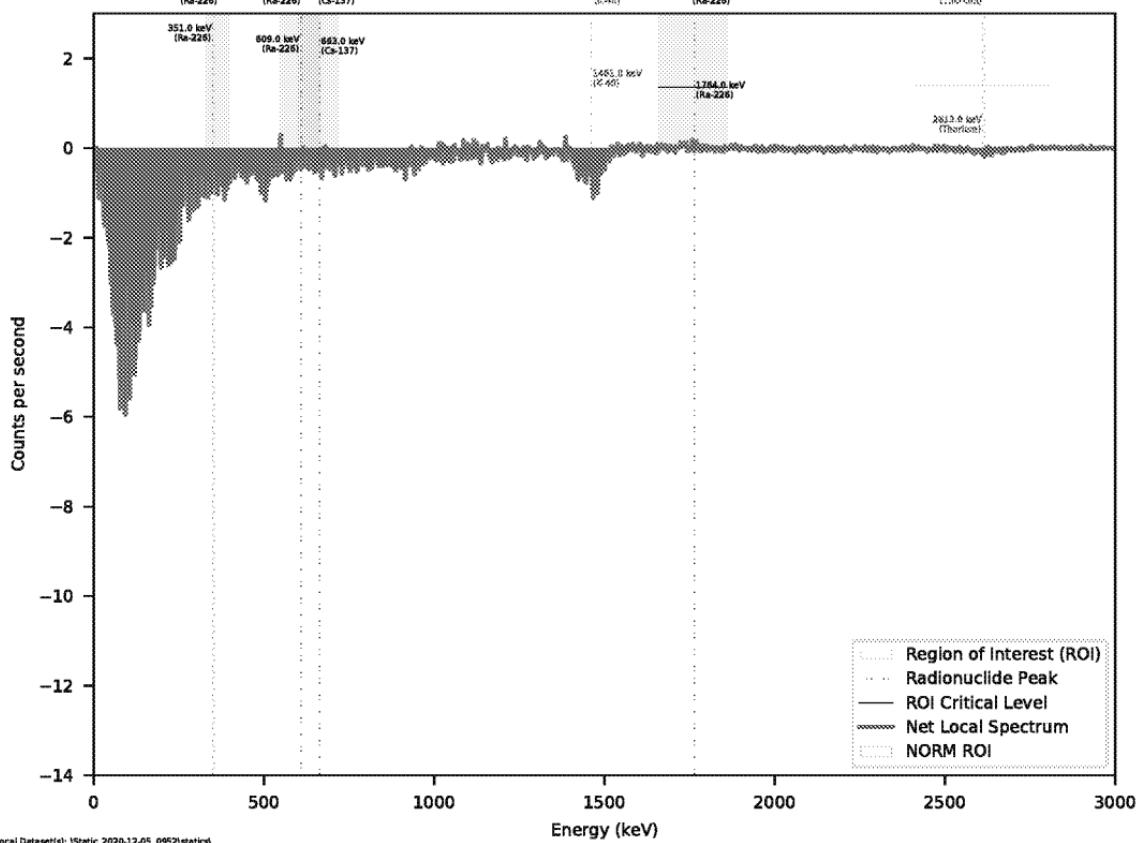
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Net Gamma Spectrum, Static Location: 14

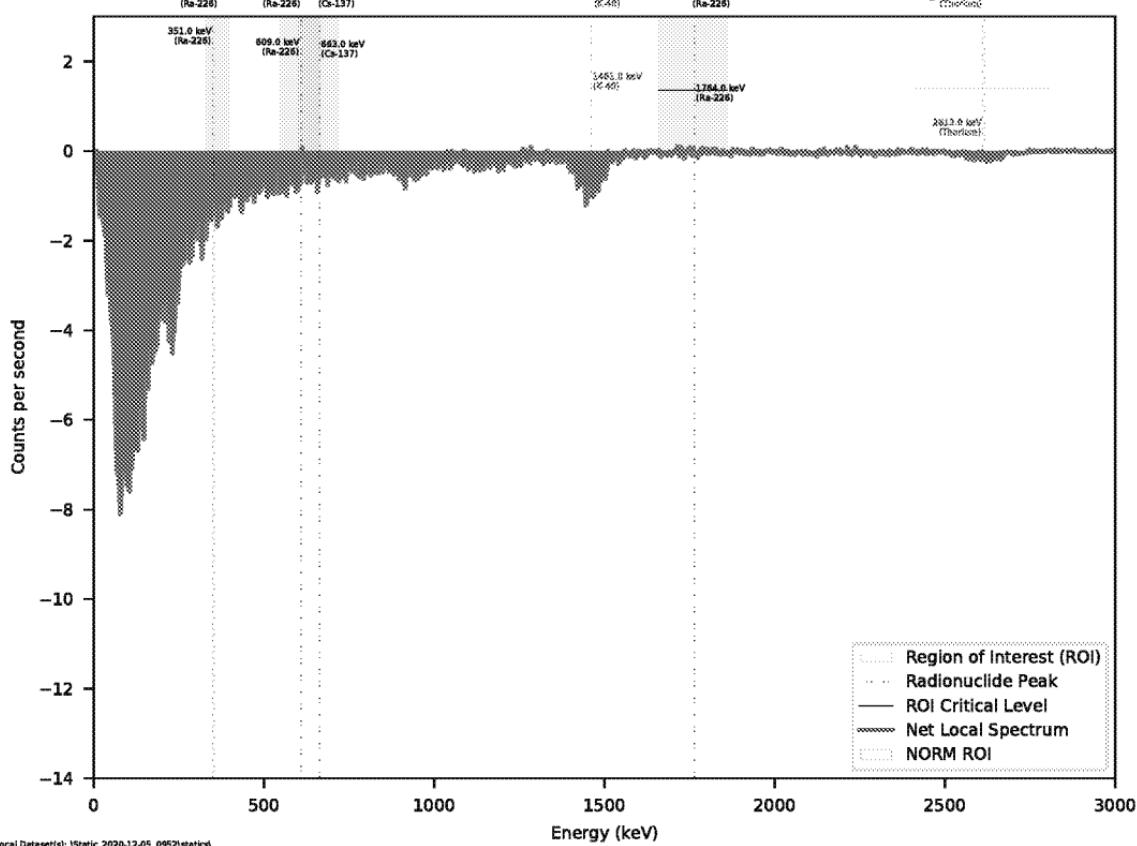
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Net Gamma Spectrum, Static Location: 15

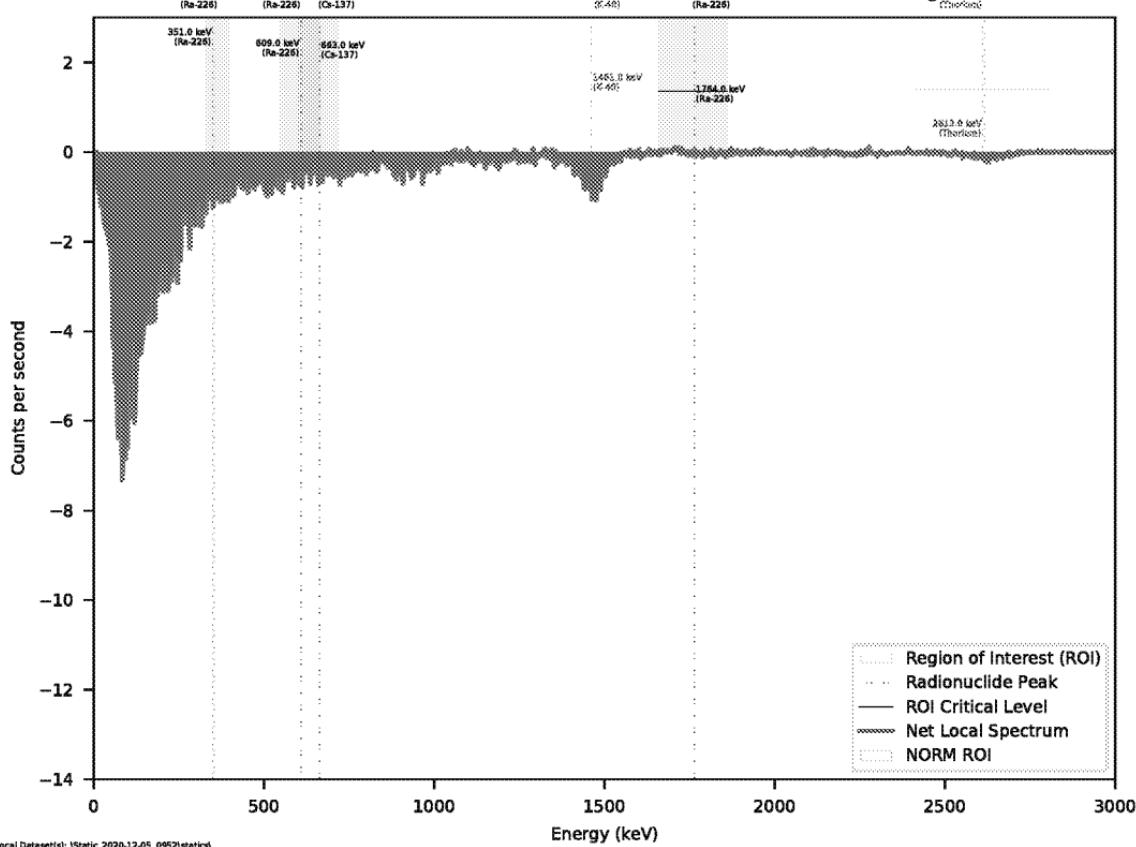
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Net Gamma Spectrum, Static Location: 16

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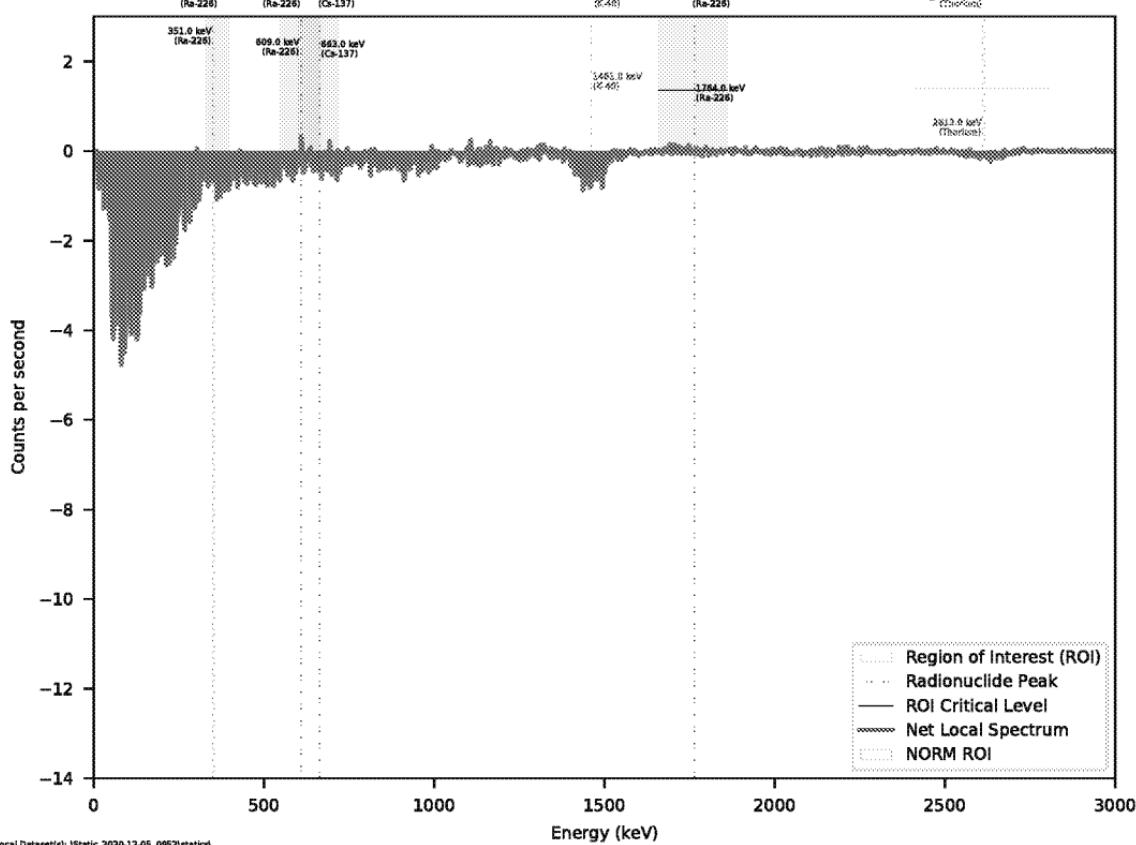
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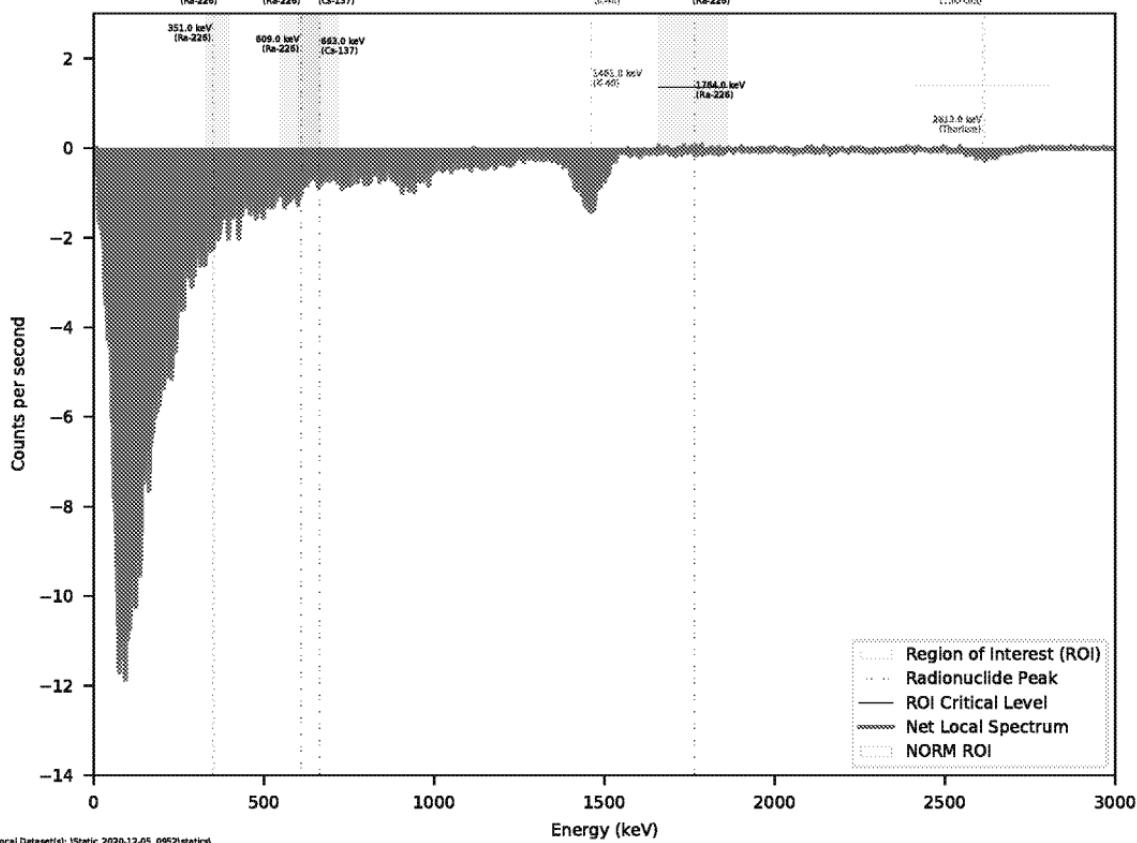
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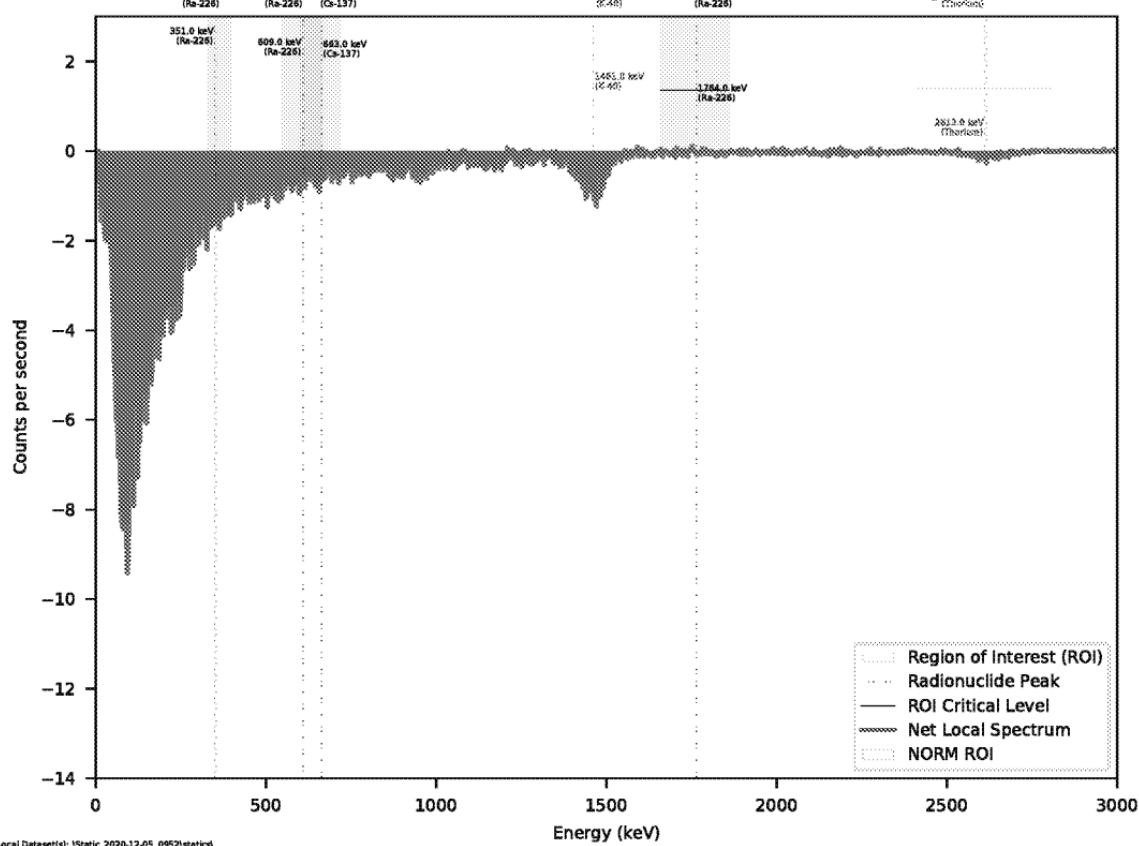
Net Gamma Spectrum, Static Location: 18

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Net Gamma Spectrum, Static Location: 19

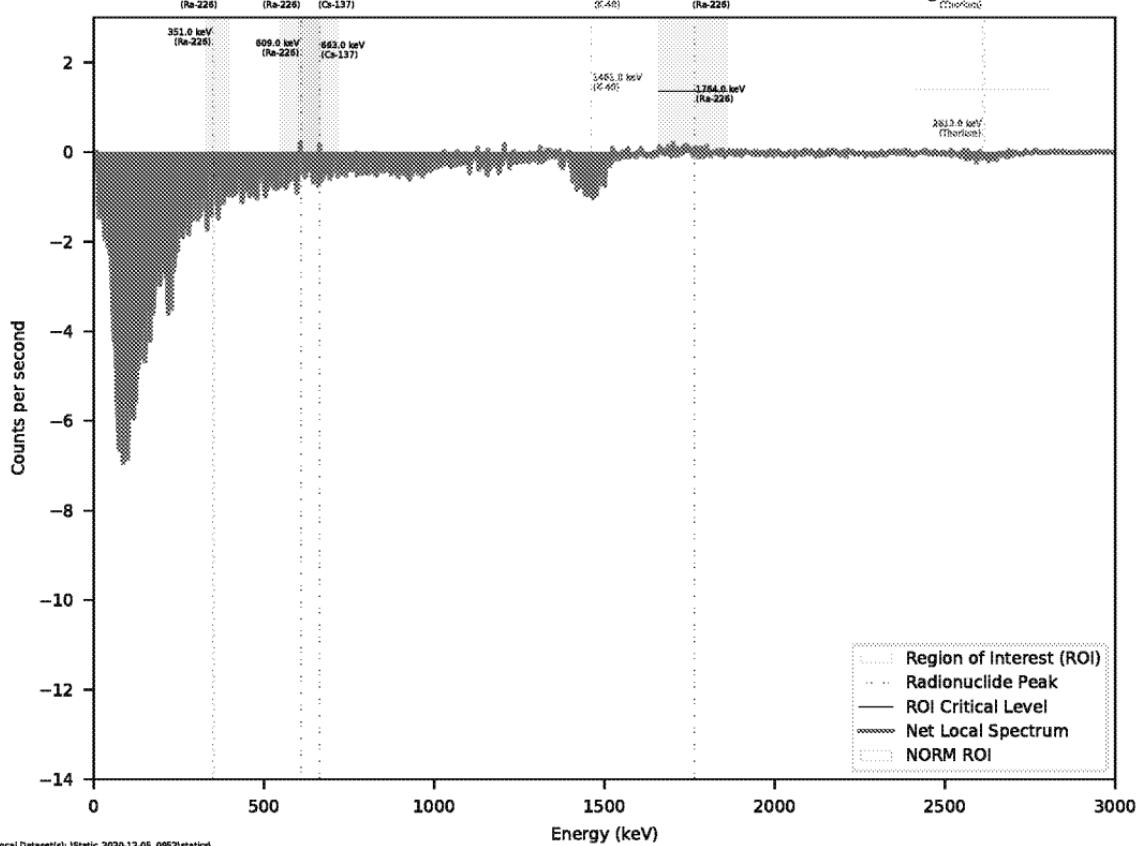
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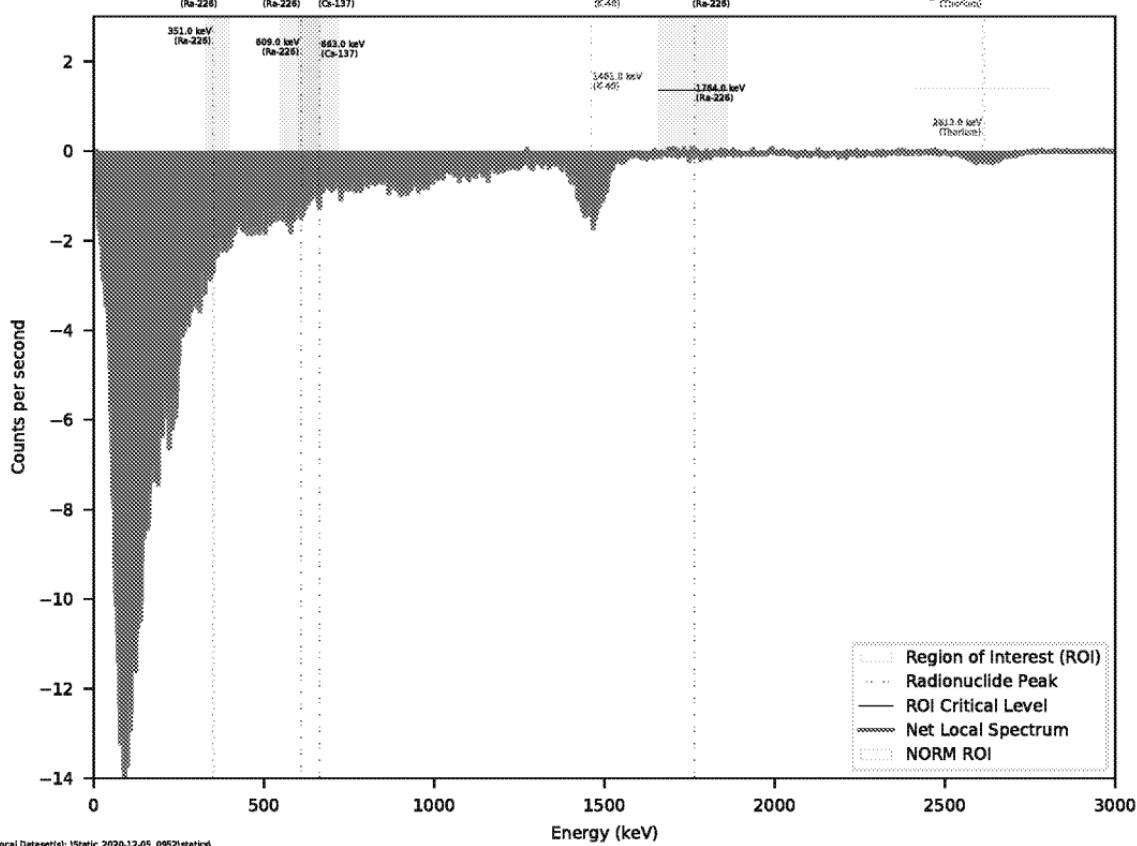
Net Gamma Spectrum, Static Location: 20

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Net Gamma Spectrum, Static Location: 21

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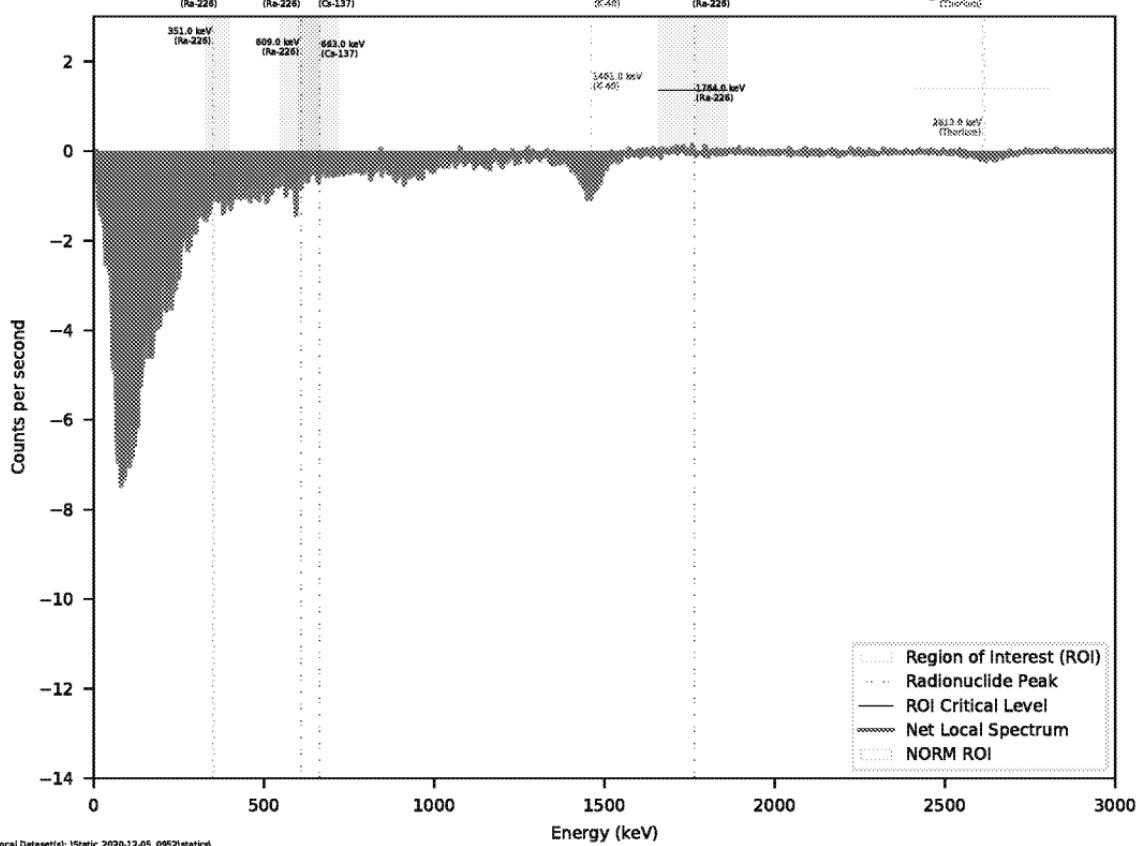
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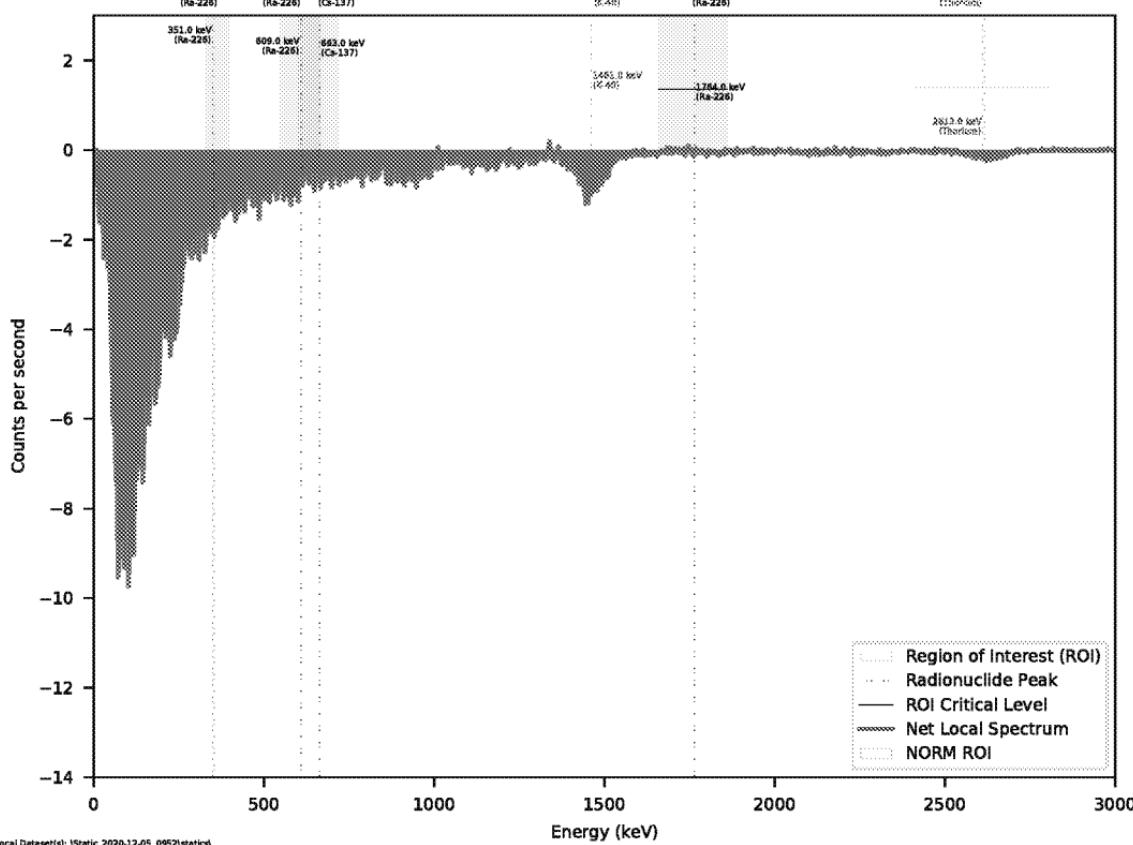
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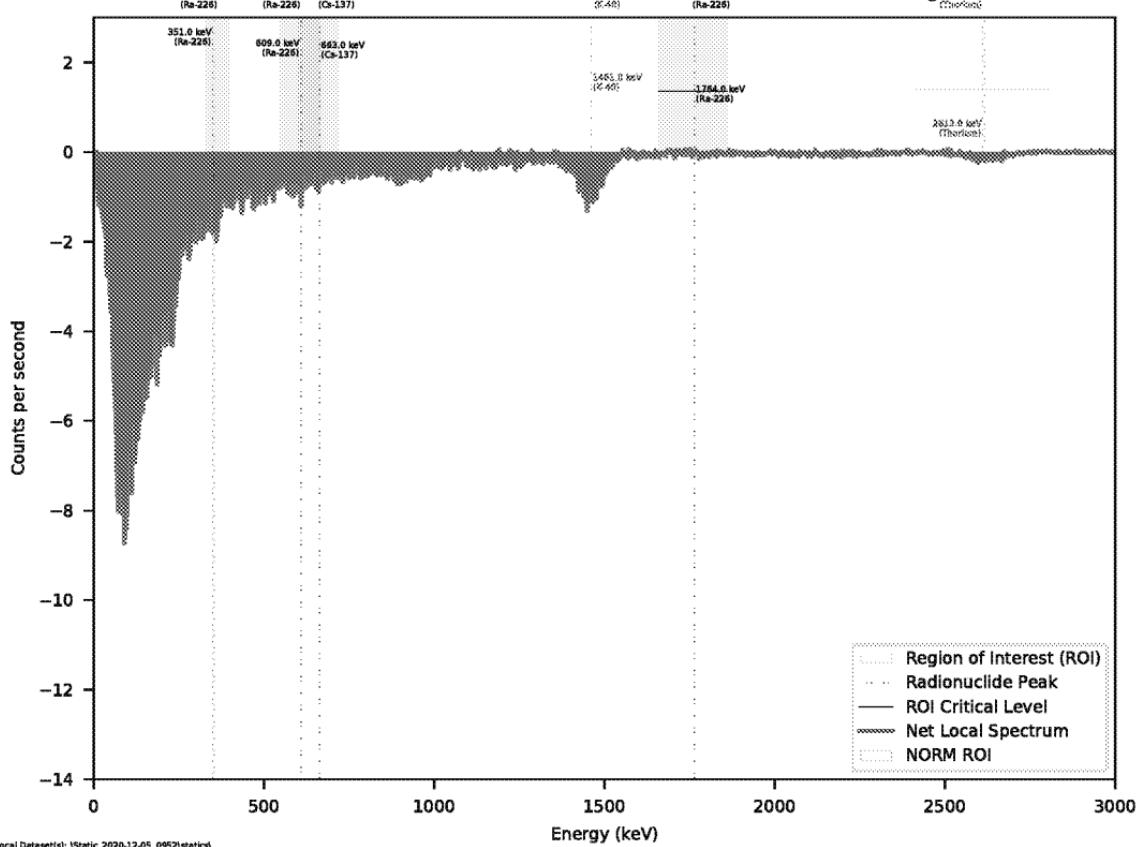
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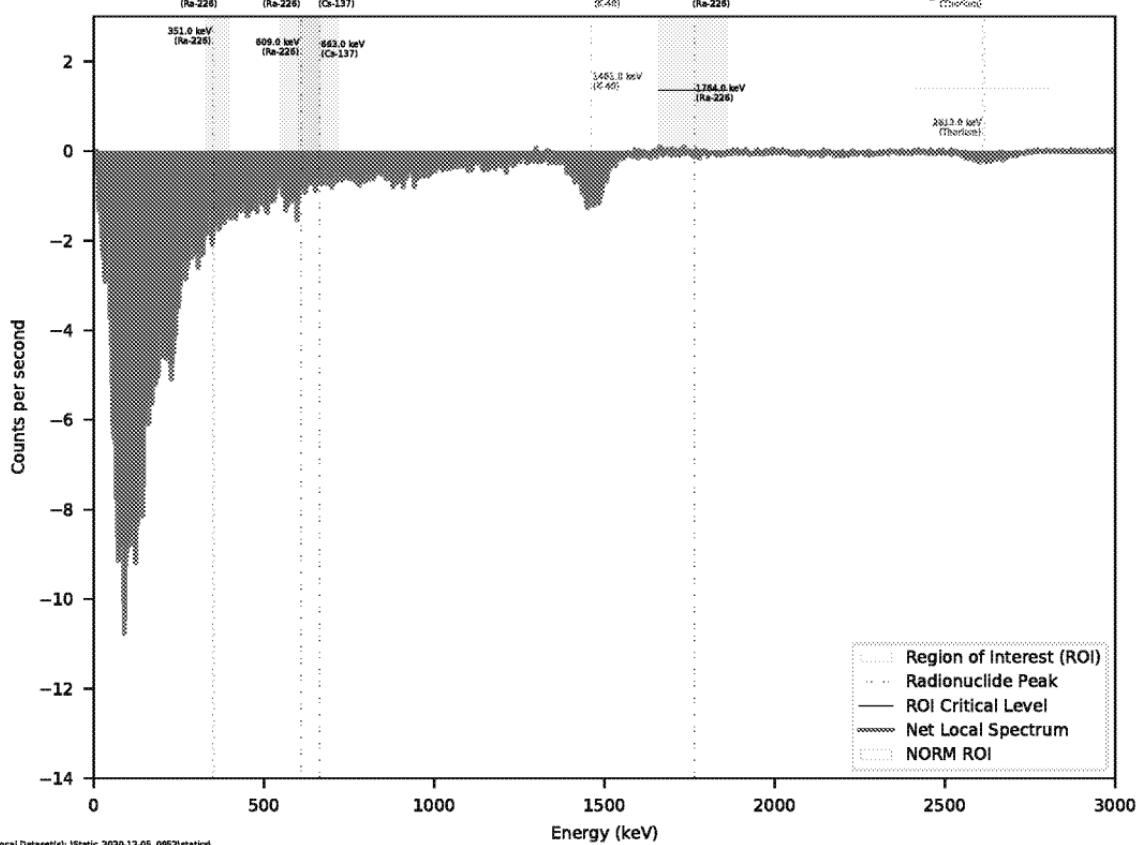
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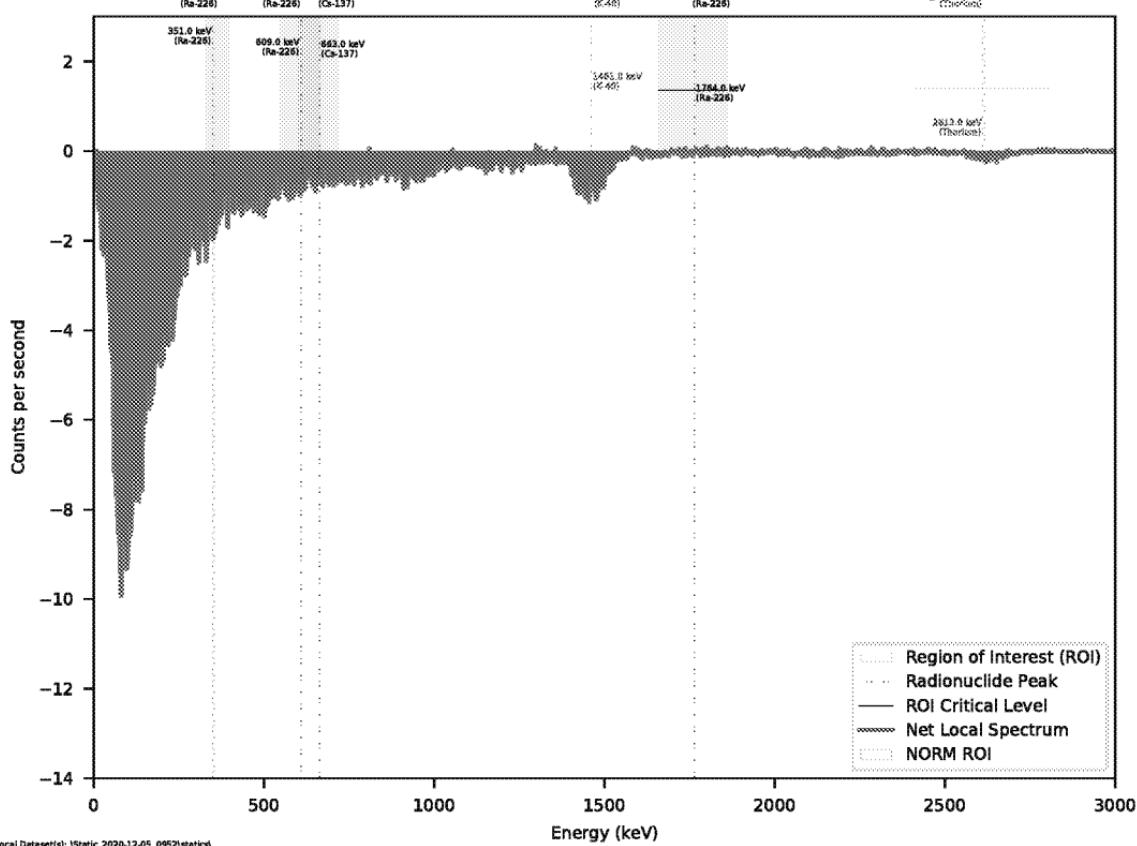
Net Gamma Spectrum, Static Location: 25

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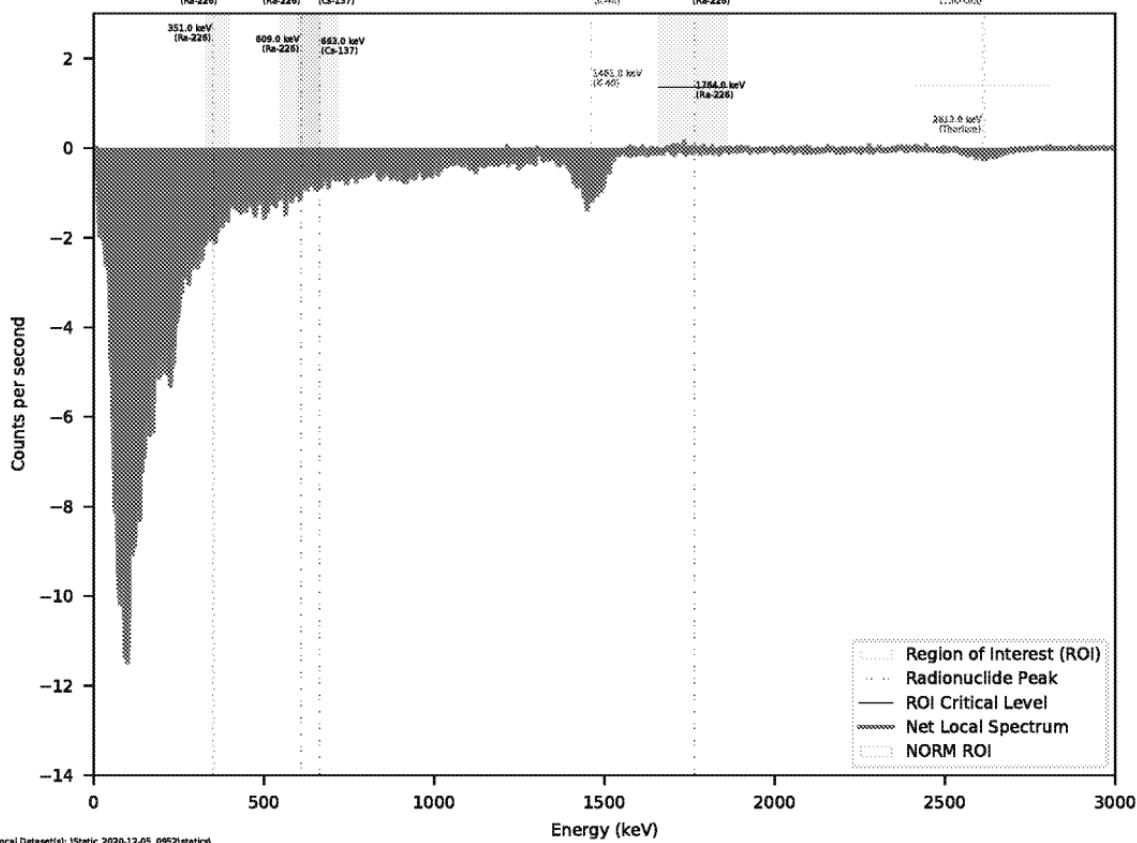
Net Gamma Spectrum, Static Location: 26

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Net Gamma Spectrum, Static Location: 27

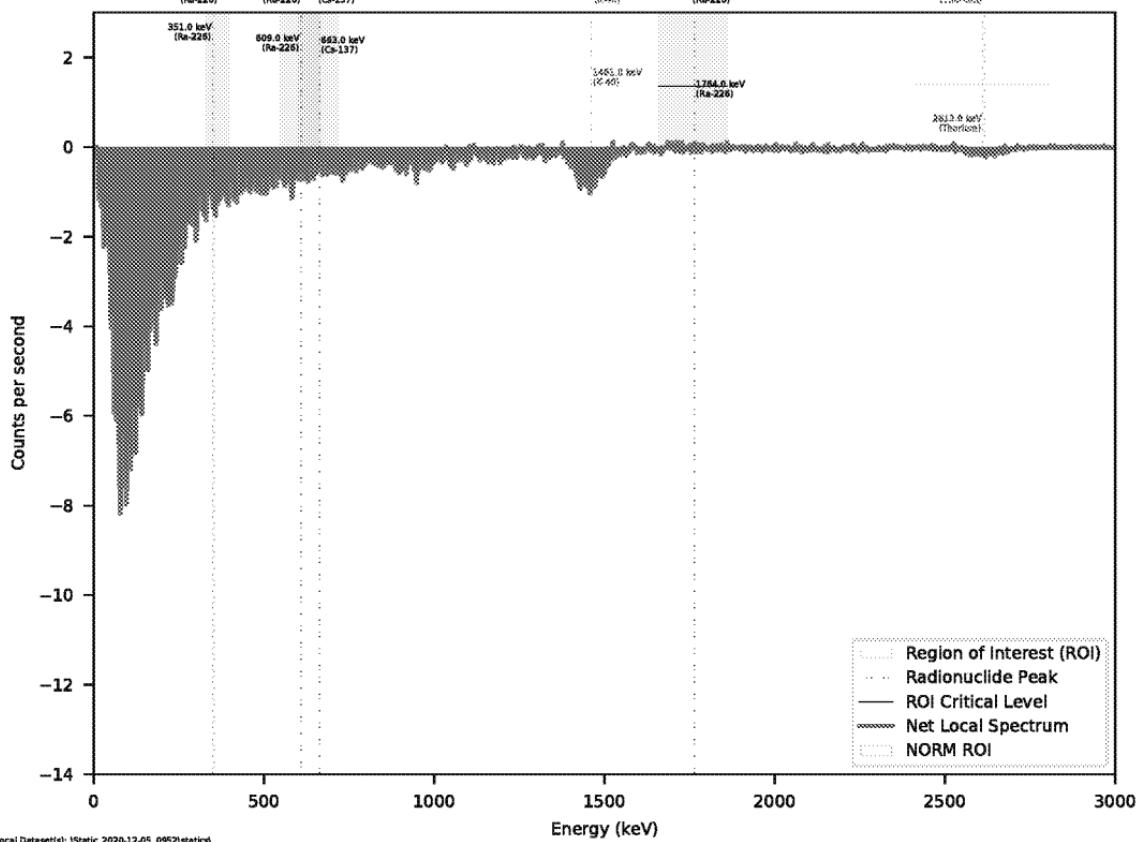
Page 40 of 80



ED_006360A_00000364-00040

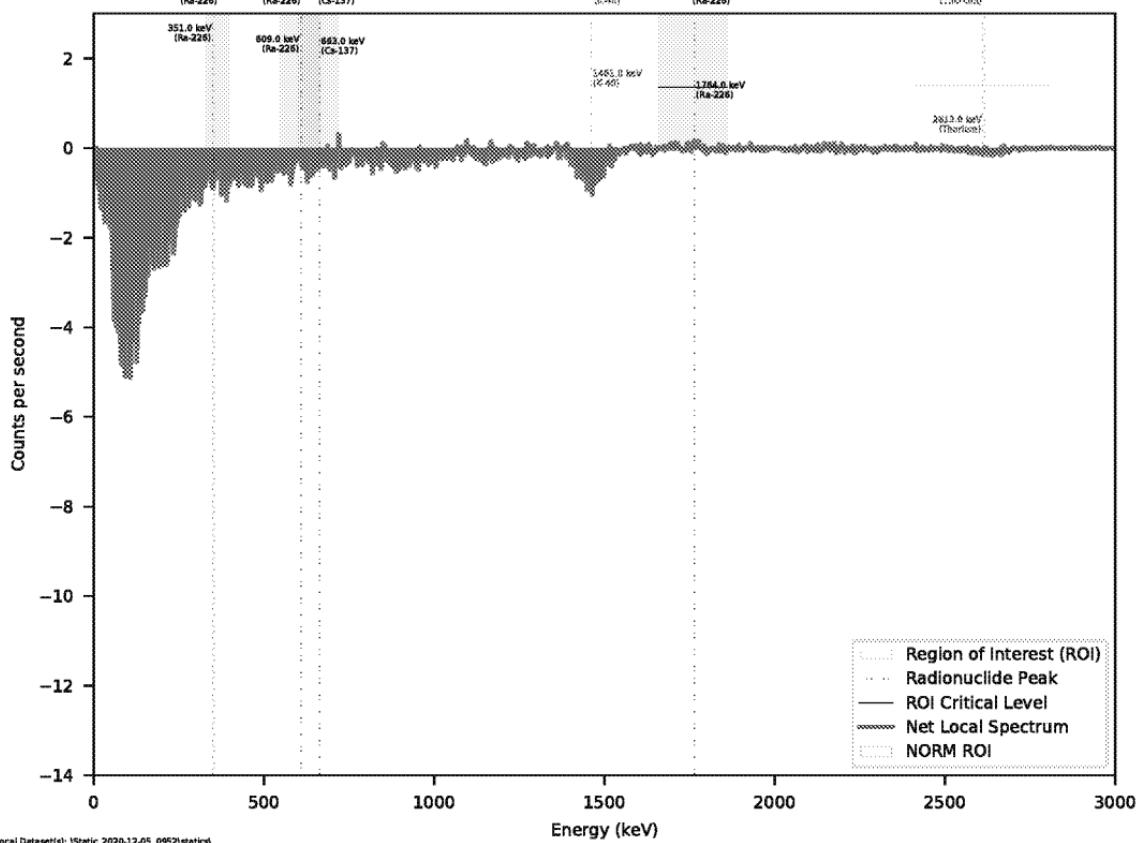
Net Gamma Spectrum, Static Location: 28

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Net Gamma Spectrum, Static Location: 29

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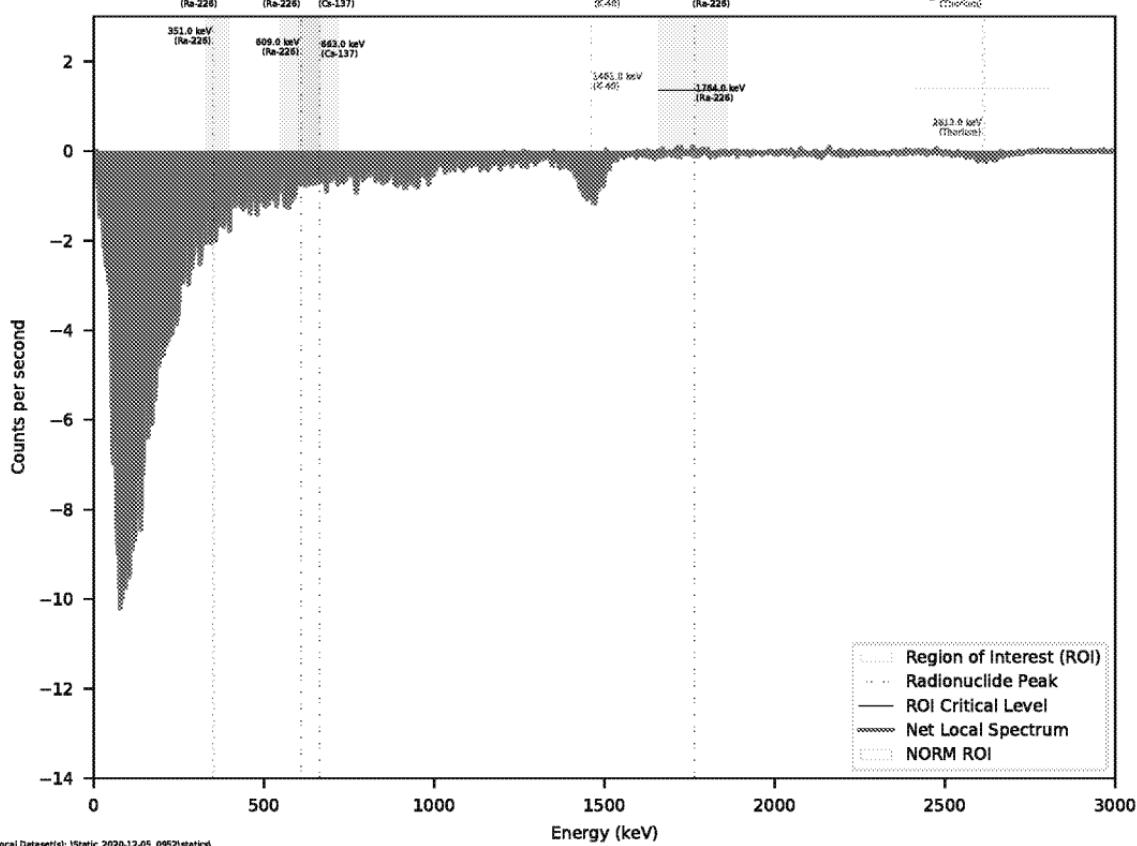
Local Dataset(s): lStatic_2020-12-05_0952/static/
Background Dataset(s): RSII_SoI/RB_A_Static.csv

Local Coordinates (Longitude, Latitude): -122.36781377862328, 37.724545715584455

ED_006360A_00000364-00042

Net Gamma Spectrum, Static Location: 30

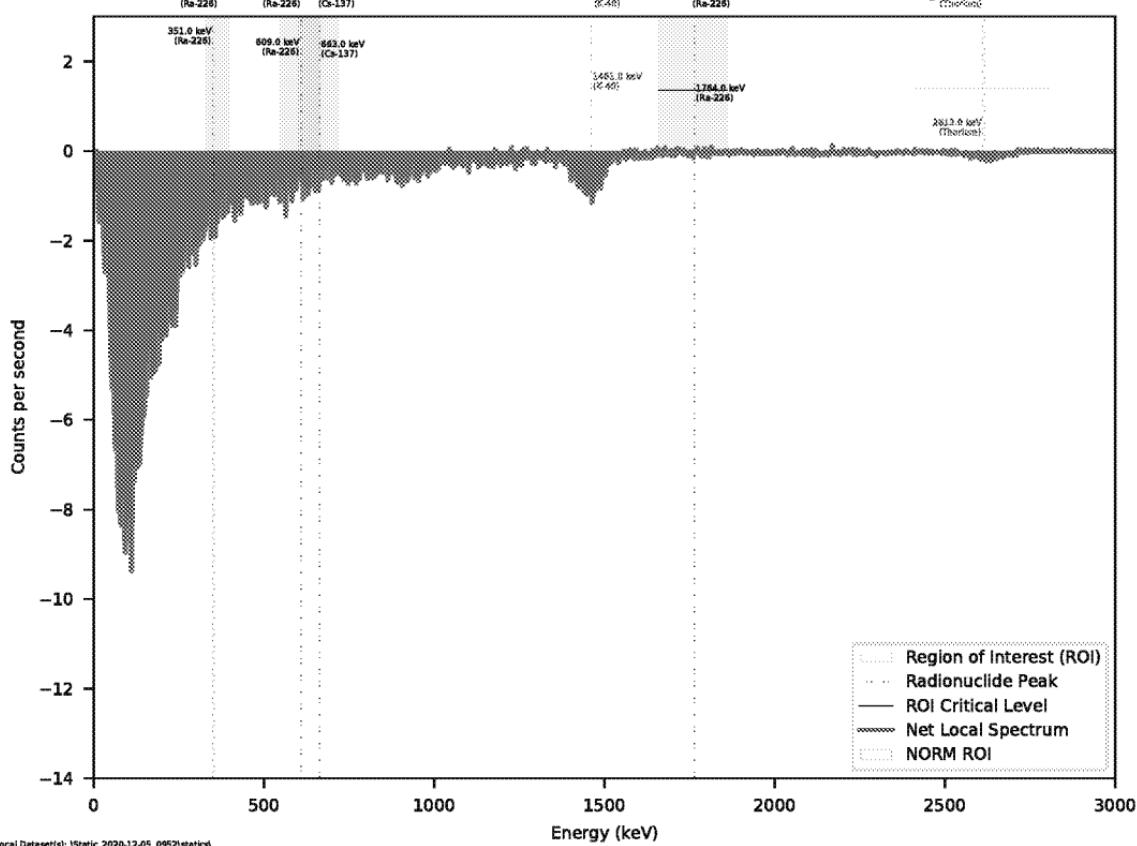
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ED_006360A_00000364-00043

Net Gamma Spectrum, Static Location: 31

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ED_006360A_00000364-00044



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-40665-1
Laboratory Sample Delivery Group: GJ46599748
Client Project/Site: HPNS-Parcel G 501197
Revision: 1

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Elizabeth M. Hoercher

Authorized for release by:
4/13/2021 10:42:15 AM
Elizabeth Hoercher, Project Manager I
Elizabeth.Hoercher@Eurofinset.com

Designee for
Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-40665-1
SDG: GJ46599748

Job ID: 160-40665-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-40665-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Additional information requested in case narrative for total strontium.

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Job ID: 160-40665-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

RECEIPT

The samples were received on 12/07/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 13.3 C.

STRONTIUM-90 (GFPC)

Samples HPPG-ESU-TU099B-001 (160-40665-1), HPPG-ESU-TU099B-011 (160-40665-11), HPPG-ESU-TU099B-021 (160-40665-21), HPPG-ESU-TU099B-B-001 (160-40665-26) and HPPG-F-054 (160-40665-28) were analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 12/08/2020, prepared on 12/28/2020 and analyzed on 01/06/2021.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP. HPPG-ESU-TU099B-001 (160-40665-1), HPPG-ESU-TU099B-011 (160-40665-11), HPPG-ESU-TU099B-021 (160-40665-21), HPPG-ESU-TU099B-B-001 (160-40665-26) and HPPG-F-054 (160-40665-28)

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-493201/23-A).

The sample duplicate precision (RER) was outside control limits: (160-40719-A-1-D DU). The sample could not be homogenized thoroughly due to sample matrix. Sample and duplicate results are less than site action limit.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-ESU-TU099B-001 (160-40665-1), HPPG-ESU-TU099B-002 (160-40665-2), HPPG-ESU-TU099B-003 (160-40665-3), HPPG-ESU-TU099B-004 (160-40665-4), HPPG-ESU-TU099B-005 (160-40665-5), HPPG-ESU-TU099B-006 (160-40665-6), HPPG-ESU-TU099B-007 (160-40665-7), HPPG-ESU-TU099B-008 (160-40665-8), HPPG-ESU-TU099B-009 (160-40665-9), HPPG-ESU-TU099B-010 (160-40665-10), HPPG-ESU-TU099B-011 (160-40665-11), HPPG-ESU-TU099B-012 (160-40665-12), HPPG-ESU-TU099B-013 (160-40665-13), HPPG-ESU-TU099B-014 (160-40665-14), HPPG-ESU-TU099B-015 (160-40665-15), HPPG-ESU-TU099B-016 (160-40665-16), HPPG-ESU-TU099B-017 (160-40665-17), HPPG-ESU-TU099B-018 (160-40665-18), HPPG-ESU-TU099B-019 (160-40665-19), HPPG-ESU-TU099B-020 (160-40665-20), HPPG-ESU-TU099B-021 (160-40665-21), HPPG-ESU-TU099B-022 (160-40665-22), HPPG-ESU-TU099B-023 (160-40665-23), HPPG-ESU-TU099B-024 (160-40665-24), HPPG-ESU-TU099B-025 (160-40665-25), HPPG-ESU-TU099B-B-001 (160-40665-26), HPPG-F-053 (160-40665-27) and HPPG-F-054 (160-40665-28) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 12/08/2020, prepared on 12/10/2020 and analyzed on 01/12/2021 and 12/31/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Job ID: 160-40665-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Gamma prep batch 491421

The detection goal of 0.07 pCi/g was not met for Cs-137 for the method blank. An elevated MDC can occur when higher background counts are applied to a peak ROI. This is due to the relatively small size of the peak or subsequent "force-fit" of the non-existent peak which resulted in higher than normal background counts due to statistical fluctuations in the Compton baseline. The laboratory does not believe this adversely affects the data, the Cs-137 is well below the RL and MDC. (MB 160-491421/1-A)

The replicate precision for Bi-214/Ra-226 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (160-40665-A-24-C DU)

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

HPPG-ESU-TU099B-009 (160-40665-9)

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491421/1-A)

Gamma prep batch 491424

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU for U-238/Th-234: HPPG-F-053 (160-40665-27). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491424/1-A)

Gamma prep batch 491419

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

HPPG-ESU-TU099B-004 (160-40665-4)

The method blank (MB) Z-score is within limits and is located in the level IV raw data. (MB 160-491419/1 -A).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CHAIN OF CUSTODY

Ref. Document # 501197RSY-051

Page 1 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Berclik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murn
Paul LeBlanc

				Project Number: 501197		Analysis Requested									
				Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action											
				Project Location: San Francisco, CA											
				Purchase Order #: 1159058											
				Shipment/Pickup Date: 12/5/2020											
				Waybill Number: 4487 0225 6148											
				Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046											
Lab Contact Name/ph #				Sample Spec (EPA 9011M) - F1M121		Sample Spec (EPA 905 M05)						Dose Rate uR/Hr	Evidence Bag ID	Comment	
				Sample in growth medium											
				Rhoeda Ridenbower (314)298-8566		Preservatives (water)									
				Preservatives (soil)											
Sample ID	Date	Time	Method	Matrix	# of Containers	Container Type									
HPPG-ESU-TU099B-001	12/5/2020	08:22	G	SO	1	16 oz. plastic jar						X	X	4	GJ46599748
HPPG-ESU-TU099B-002	12/5/2020	08:26	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-003	12/5/2020	08:30	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-004	12/5/2020	08:36	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-005	12/5/2020	08:44	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-006	12/5/2020	08:37	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-007	12/5/2020	08:48	G	SO	1	16 oz. plastic jar						X		4	GJ46599748
HPPG-ESU-TU099B-008	12/5/2020	08:49	G	SO	1	16 oz. plastic jar						X		4	GJ46599748

Special Instructions:

21 day ingrowth results only

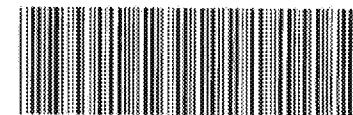
Turnaround Time: 3-day 10-Day 28-day Other Level of QC Required: I II III Project Specific

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; SO = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By: Relinquisher Signature: Relinquish Date Time: Received By: Received Signature: Receive Date Time:

Lewis, Devin		12/05/2020 11:22	SHIPPEDTOLAB		12/7/20 08:56
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*** Last 3 transfers shown above - Complete list of transfers on last page ***



160-40665 Chain of Custody



ED_006360A_00000364-00050



CHAIN OF CUSTODY

Ref. Document # 501197RSY-051

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Page 2 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520

Project Manager: Lisa Bercik
Phone #: (619)213-3389

Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murn
Paul LeBlanc

Project Number: 501197

Hunters Point Naval Shipyard: Parcel
Project Name: G Remedial Action

Project Location: San Francisco, CA

Purchase Order #: 1159058

Shipment/Pickup Date: 12/5/2020

Waybill Number: 4957 0225 6148

Test America (St. Louis Lab)
13715 Rider Trail North
Earth City, MO 63046

Lab Destination:

Lab Contact Name/ph #

Rhoeda Ridenbower (314)298-8566

Sample ID	Collection Information				# of Containers	Matrix	Analysis Requested				Dose Rate uR/Hr	Evidence Bag ID	Comment					
	Date	Time	Method	Preservatives			Preservatives (water)											
							Preservatives (soil)											
HPPG-ESU-TU099B-009	12/5/2020	08:51	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-010	12/5/2020	08:54	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-011	12/5/2020	08:55	G	SO	1	16 oz. plastic jar	X	X			4	GJ46599748						
HPPG-ESU-TU099B-012	12/5/2020	08:57	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-013	12/5/2020	09:01	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-014	12/5/2020	09:05	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-015	12/5/2020	09:02	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-016	12/5/2020	09:03	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-017	12/5/2020	09:15	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-018	12/5/2020	09:06	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-019	12/5/2020	09:07	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-020	12/5/2020	09:09	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-021	12/5/2020	09:12	G	SO	1	16 oz. plastic jar	X	X			4	GJ46599748						
HPPG-ESU-TU099B-022	12/5/2020	09:13	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-023	12/5/2020	09:16	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-024	12/5/2020	09:18	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						
HPPG-ESU-TU099B-025	12/6/2020	09:21	G	SO	1	16 oz. plastic jar	X				4	GJ46599748						





CHAIN OF CUSTODY

Ref. Document # 501197RSY-051

Page 3 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Candit
Phone/Fax Number: 415-387-9760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Andrew Murri
Paul LeBlanc

Project Number: 501197

Hunters Point Naval Shipyard: Parcel
G Remedial Action

Project Location: San Francisco, CA

Purchase Order #: 1159058

Shipment/Pickup Date: 12/5/2020

Waybill Number: 41957 0325 8119

Test America (St. Louis Lab)
13715 Rider Trail North
Earth City, MO 63046

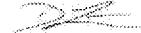
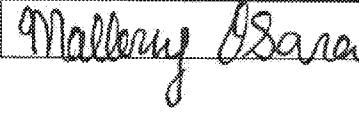
Lab Contact Name/ph #

Rhoeda Ridenbower (314)298-8566

	Collection Information				# of Containers	Matrix	Analysis Requested				Dose Rate uR/Hr	Evidence Bag ID	Comment
	Sample ID	Date	Time	Method			Preservatives (water)	Preservatives (soil)	Container Type	Speciation	Strontium-90 (EP-A 905 MDD)	Lead-210 (EP-A 901, 1 M) - Full 21	
HPPG-ESU-TU099B-B-001	12/5/2020	08:53	G	SO	1	16 oz. plastic jar	X	X			X	4	GJ46599748
HPPG-F-053	12/5/2020	09:06	G	SO	1	16 oz. plastic jar	X					4	GJ46599748
HPPG-F-054	12/5/2020	09:12	G	SO	1	16 oz. plastic jar	X	X				4	GJ46599748



All Transfers for COC 501197RSY-051

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		12/05/2020 11:22	SHIPPEDTOLAB		12/7/20 08:56

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-40665-1
SDG Number: GJ46599748**Login Number:** 40665**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Greer, Diane A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-40665-1
SDG: GJ46599748

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-40665-1
SDG: GJ46599748

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-40665-1	HPPG-ESU-TU099B-001	Solid	12/05/20 08:22	12/07/20 08:56	
160-40665-2	HPPG-ESU-TU099B-002	Solid	12/05/20 08:26	12/07/20 08:56	
160-40665-3	HPPG-ESU-TU099B-003	Solid	12/05/20 08:30	12/07/20 08:56	
160-40665-4	HPPG-ESU-TU099B-004	Solid	12/05/20 08:36	12/07/20 08:56	
160-40665-5	HPPG-ESU-TU099B-005	Solid	12/05/20 08:44	12/07/20 08:56	
160-40665-6	HPPG-ESU-TU099B-006	Solid	12/05/20 08:37	12/07/20 08:56	
160-40665-7	HPPG-ESU-TU099B-007	Solid	12/05/20 08:48	12/07/20 08:56	
160-40665-8	HPPG-ESU-TU099B-008	Solid	12/05/20 08:49	12/07/20 08:56	
160-40665-9	HPPG-ESU-TU099B-009	Solid	12/05/20 08:51	12/07/20 08:56	
160-40665-10	HPPG-ESU-TU099B-010	Solid	12/05/20 08:54	12/07/20 08:56	
160-40665-11	HPPG-ESU-TU099B-011	Solid	12/05/20 08:55	12/07/20 08:56	
160-40665-12	HPPG-ESU-TU099B-012	Solid	12/05/20 08:57	12/07/20 08:56	
160-40665-13	HPPG-ESU-TU099B-013	Solid	12/05/20 09:01	12/07/20 08:56	
160-40665-14	HPPG-ESU-TU099B-014	Solid	12/05/20 09:05	12/07/20 08:56	
160-40665-15	HPPG-ESU-TU099B-015	Solid	12/05/20 09:02	12/07/20 08:56	
160-40665-16	HPPG-ESU-TU099B-016	Solid	12/05/20 09:03	12/07/20 08:56	
160-40665-17	HPPG-ESU-TU099B-017	Solid	12/05/20 09:15	12/07/20 08:56	
160-40665-18	HPPG-ESU-TU099B-018	Solid	12/05/20 09:06	12/07/20 08:56	
160-40665-19	HPPG-ESU-TU099B-019	Solid	12/05/20 09:07	12/07/20 08:56	
160-40665-20	HPPG-ESU-TU099B-020	Solid	12/05/20 09:09	12/07/20 08:56	
160-40665-21	HPPG-ESU-TU099B-021	Solid	12/05/20 09:12	12/07/20 08:56	
160-40665-22	HPPG-ESU-TU099B-022	Solid	12/05/20 09:13	12/07/20 08:56	
160-40665-23	HPPG-ESU-TU099B-023	Solid	12/05/20 09:16	12/07/20 08:56	
160-40665-24	HPPG-ESU-TU099B-024	Solid	12/05/20 09:18	12/07/20 08:56	
160-40665-25	HPPG-ESU-TU099B-025	Solid	12/05/20 09:21	12/07/20 08:56	
160-40665-26	HPPG-ESU-TU099B-B-001	Solid	12/05/20 08:53	12/07/20 08:56	
160-40665-27	HPPG-F-053	Solid	12/05/20 09:06	12/07/20 08:56	
160-40665-28	HPPG-F-054	Solid	12/05/20 09:12	12/07/20 08:56	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-001

Lab Sample ID: 160-40665-1

Date Collected: 12/05/20 08:22

Matrix: Solid

Date Received: 12/07/20 08:56

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.0115	U	0.134	0.134	0.331	0.109	pCi/g	12/28/20 17:03	01/06/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	94.8		40 - 110					12/28/20 17:03	01/06/21 17:37	1
Y Carrier	92.7		40 - 110					12/28/20 17:03	01/06/21 17:37	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.342		0.112	0.118		0.0410	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Actinium-227	0.0900	U	0.191	0.191		0.225	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Bismuth-212	-0.195	U	0.498	0.498		0.392	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Bismuth-214	0.246		0.0792	0.0832		0.0316	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Cesium-137	-0.0155	U	0.0459	0.0459	0.0700	0.0327	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Lead-210	0.000	U	0.456	0.456		0.680	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Lead-212	0.173		0.0473	0.0523		0.0226	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Lead-214	0.282		0.0710	0.0768		0.0380	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Potassium-40	7.67		1.05	1.31		0.218	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Protactinium-231	0.231	U	0.892	0.892		1.39	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Protactinium-234	0.0122	U	0.0205	0.0206		0.151	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Radium-226	0.246		0.0792	0.0832	0.200	0.0316	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Radium-228	0.342		0.112	0.118		0.0410	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Thallium-208	0.0754		0.0437	0.0444		0.0180	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Thorium 228	0.173		0.0473	0.0523		0.0226	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Thorium-232	0.342		0.112	0.118		0.0410	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Thorium-234	0.223	U	0.482	0.483		0.640	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Uranium-235	0.000	U	0.107	0.107		0.268	pCi/g	12/10/20 14:21	01/12/21 17:41	1
Uranium-238	0.223	U	0.482	0.483		0.640	pCi/g	12/10/20 14:21	01/12/21 17:41	1

Client Sample ID: HPPG-ESU-TU099B-002

Lab Sample ID: 160-40665-2

Date Collected: 12/05/20 08:26

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.306		0.167	0.170		0.0614	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Actinium-227	-0.322	U	0.613	0.614		0.369	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Bismuth-212	-0.0512	U	0.643	0.643		0.525	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Bismuth-214	0.283		0.111	0.114		0.0514	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Cesium-137	-0.0466	U	0.0752	0.0754	0.0700	0.0587	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Lead-210	0.684	U	1.10	1.11		0.758	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Lead-212	0.213		0.0655	0.0692		0.0342	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Lead-214	0.275		0.108	0.111		0.0564	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Potassium-40	7.21		1.15	1.36		0.106	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Protactinium-231	0.378	U	1.49	1.49		1.74	pCi/g	12/10/20 14:21	01/12/21 17:42	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-002
Date Collected: 12/05/20 08:26
Date Received: 12/07/20 08:56

Lab Sample ID: 160-40665-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Protactinium-234	0.0576	U	0.175	0.175		0.185	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Radium-226	0.283		0.111	0.114	0.200	0.0514	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Radium-228	0.306		0.167	0.170		0.0614	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Thallium-208	0.118		0.0548	0.0561		0.0204	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Thorium 228	0.213		0.0655	0.0692		0.0342	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Thorium-232	0.306		0.167	0.170		0.0614	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Thorium-234	-0.117	U	0.816	0.817		0.669	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Uranium-235	0.0972	U	0.196	0.196		0.342	pCi/g	12/10/20 14:21	01/12/21 17:42	1
Uranium-238	-0.117	U	0.816	0.817		0.669	pCi/g	12/10/20 14:21	01/12/21 17:42	1

Client Sample ID: HPPG-ESU-TU099B-003

Lab Sample ID: 160-40665-3

Date Collected: 12/05/20 08:30

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.321		0.105	0.110		0.0201	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Actinium-227	0.113	U	0.407	0.407		0.238	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Bismuth-212	0.223	U	0.532	0.533		0.419	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Bismuth-214	0.226		0.0708	0.0746		0.0249	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Cesium-137	0.0177	U	0.0297	0.0297	0.0700	0.0221	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Lead-210	0.411	U	0.900	0.902		0.717	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Lead-212	0.223		0.0526	0.0600		0.0238	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Lead-214	0.265		0.0842	0.0886		0.0352	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Potassium-40	7.32		0.998	1.25		0.0793	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Protactinium-231	0.000	U	0.393	0.393		1.39	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Protactinium-234	0.0527	U	0.0813	0.0815		0.151	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Radium-226	0.226		0.0708	0.0746	0.200	0.0249	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Radium-228	0.321		0.105	0.110		0.0201	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Thallium-208	0.0963		0.0281	0.0298		0.00491	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Thorium 228	0.223		0.0526	0.0600		0.0238	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Thorium-232	0.321		0.105	0.110		0.0201	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Thorium-234	0.0436	U	0.384	0.384		0.622	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Uranium-235	0.000	U	0.101	0.101		0.260	pCi/g	12/10/20 14:21	01/12/21 17:43	1
Uranium-238	0.0436	U	0.384	0.384		0.622	pCi/g	12/10/20 14:21	01/12/21 17:43	1

Client Sample ID: HPPG-ESU-TU099B-004

Lab Sample ID: 160-40665-4

Date Collected: 12/05/20 08:36

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.0589	U	0.216	0.216		0.113	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Actinium-227	0.166	U	0.262	0.263		0.268	pCi/g	12/10/20 14:21	01/12/21 17:45	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-004

Lab Sample ID: 160-40665-4

Date Collected: 12/05/20 08:36

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-212	-0.0232	U	0.828	0.828		0.680	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Bismuth-214	0.306		0.104	0.109		0.0415	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Cesium-137	-0.0660	U	0.0972	0.0975	0.0700	0.0757	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Lead-210	-0.0320	U	1.56	1.56		1.28	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Lead-212	0.0291	U	0.0933	0.0934		0.0748	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Lead-214	0.200		0.127	0.129		0.0731	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Potassium-40	7.63		1.39	1.59		0.247	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Protactinium-231	0.589	U	1.68	1.68		1.84	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Protactinium-234	0.327		0.195	0.198		0.191	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Radium-226	0.306		0.104	0.109	0.200	0.0415	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Radium-228	0.0589	U	0.216	0.216		0.113	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Thallium-208	0.197		0.0530	0.0568		0.00804	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Thorium 228	0.0291	U	0.0933	0.0934		0.0748	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Thorium-232	0.0589	U	0.216	0.216		0.113	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Thorium-234	0.568		0.504	0.508		0.381	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Uranium-235	0.0958	U	0.188	0.188		0.362	pCi/g	12/10/20 14:21	01/12/21 17:45	1
Uranium-238	0.568		0.504	0.508		0.381	pCi/g	12/10/20 14:21	01/12/21 17:45	1

Client Sample ID: HPPG-ESU-TU099B-005

Lab Sample ID: 160-40665-5

Date Collected: 12/05/20 08:44

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.197		0.105	0.107		0.0375	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Actinium-227	0.0764	U	0.317	0.317		0.327	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Bismuth-212	-0.0211	U	0.567	0.567		0.577	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Bismuth-214	0.266		0.130	0.132		0.0743	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Cesium-137	0.0411		0.0361	0.0364	0.0700	0.0200	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Lead-210	0.673		0.917	0.920		0.620	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Lead-212	0.216		0.0704	0.0757		0.0356	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Lead-214	0.136		0.0865	0.0877		0.0680	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Potassium-40	5.87		1.28	1.41		0.256	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Protactinium-231	0.279	U	1.08	1.08		1.74	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Protactinium-234	0.0161	U	0.0363	0.0363		0.146	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Radium-226	0.266		0.130	0.132	0.200	0.0743	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Radium-228	0.197		0.105	0.107		0.0375	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thallium-208	0.0983		0.0589	0.0598		0.0338	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium 228	0.216		0.0704	0.0757		0.0356	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium-232	0.197		0.105	0.107		0.0375	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium-234	0.673		0.467	0.473		0.283	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Uranium-235	0.103	U	0.235	0.235		0.229	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Uranium-238	0.673		0.467	0.473		0.283	pCi/g	12/10/20 15:08	12/31/20 09:23	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-006

Lab Sample ID: 160-40665-6

Matrix: Solid

Date Collected: 12/05/20 08:37
Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.335		0.112	0.117		0.0217	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Actinium-227	-0.173	U	0.671	0.671		0.278	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Bismuth-212	-0.269	U	0.387	0.388		0.495	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Bismuth-214	0.221		0.0914	0.0943		0.0434	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Cesium-137	0.0134	U	0.0295	0.0295	0.0700	0.0223	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Lead-210	0.314	U		1.16		0.939	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Lead-212	0.236		0.0573	0.0649		0.0265	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Lead-214	0.270		0.0710	0.0763		0.0415	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Potassium-40	6.80		1.05	1.26		0.243	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Protactinium-231	0.255	U	0.967	0.967		1.50	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Protactinium-234	0.185		0.110	0.112		0.133	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Radium-226	0.221		0.0914	0.0943	0.200	0.0434	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Radium-228	0.335		0.112	0.117		0.0217	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Thallium-208	0.0437		0.0361	0.0364		0.0299	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Thorium 228	0.236		0.0573	0.0649		0.0265	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Thorium-232	0.335		0.112	0.117		0.0217	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Thorium-234	-0.0274	U	0.0582	0.0583		0.792	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Uranium-235	0.0961	U	0.199	0.199		0.120	pCi/g	12/10/20 15:08	12/31/20 09:28	1
Uranium-238	-0.0274	U	0.0582	0.0583		0.792	pCi/g	12/10/20 15:08	12/31/20 09:28	1

Client Sample ID: HPPG-ESU-TU099B-007

Lab Sample ID: 160-40665-7

Matrix: Solid

Date Collected: 12/05/20 08:48
Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.0980	U	0.156	0.156		0.104	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Actinium-227	0.174	U	0.361	0.361		0.207	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Bismuth-212	-0.258	U	0.515	0.516		0.402	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Bismuth-214	0.244		0.0800	0.0839		0.0348	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Cesium-137	-0.0116	U	0.0428	0.0428	0.0700	0.0343	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-210	-0.551	U	1.00	1.00		0.798	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-212	0.191		0.0479	0.0539		0.0215	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-214	0.250		0.0656	0.0706		0.0334	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Potassium-40	6.02		0.881	1.08		0.0751	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Protactinium-231	0.000	U	0.438	0.438		1.29	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Protactinium-234	0.0693	U	0.137	0.137		0.141	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Radium-226	0.244		0.0800	0.0839	0.200	0.0348	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Radium-228	0.0980	U	0.156	0.156		0.104	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thallium-208	0.0858		0.0411	0.0421		0.0174	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium 228	0.191		0.0479	0.0539		0.0215	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium-232	0.0980	U	0.156	0.156		0.104	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium-234	0.000	U	0.285	0.285		0.599	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Uranium-235	-0.117	U	0.312	0.312		0.253	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Uranium-238	0.000	U	0.285	0.285		0.599	pCi/g	12/10/20 15:08	12/31/20 09:30	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-008
Date Collected: 12/05/20 08:49
Date Received: 12/07/20 08:56

Lab Sample ID: 160-40665-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.268		0.153	0.156		0.177	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Actinium-227	0.145	U	0.384	0.384		0.292	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Bismuth-212	0.000	U	0.500	0.500		0.539	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Bismuth-214	0.0981	U	0.0959	0.0964		0.148	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Cesium-137	0.0300	U	0.0742	0.0743	0.0700	0.0585	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Lead-210	-0.0678	U		1.51		1.24	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Lead-212	0.185		0.0861	0.0894		0.0573	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Lead-214	0.276		0.0977	0.102		0.0400	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Potassium-40	6.10		1.26	1.41		0.263	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Protactinium-231	0.600	U	1.48	1.48		1.63	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Protactinium-234	0.0286	U	0.0458	0.0459		0.221	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Radium-226	0.0981	U	0.0959	0.0964	0.200	0.148	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Radium-228	0.268		0.153	0.156		0.177	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Thallium-208	0.0542		0.103	0.103		0.0347	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Thorium 228	0.185		0.0861	0.0894		0.0573	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Thorium-232	0.268		0.153	0.156		0.177	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Thorium-234	-0.830	U	0.695	0.701		0.964	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Uranium-235	0.126	U	0.355	0.355		0.342	pCi/g	12/10/20 15:08	12/31/20 09:29	1
Uranium-238	-0.830	U	0.695	0.701		0.964	pCi/g	12/10/20 15:08	12/31/20 09:29	1

Client Sample ID: HPPG-ESU-TU099B-009

Lab Sample ID: 160-40665-9

Date Collected: 12/05/20 08:51

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.349		0.200	0.204		0.139	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Actinium-227	-0.220	U	0.596	0.596		0.431	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Bismuth-212	0.000	U	0.142	0.142		0.670	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Bismuth-214	0.310		0.119	0.124		0.0525	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Cesium-137	-0.0626	U	0.107	0.108	0.0700	0.0843	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Lead-210	1.32		1.68	1.69		1.09	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Lead-212	0.276		0.0908	0.0964		0.0529	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Lead-214	0.491		0.138	0.149		0.0545	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Potassium-40	8.47		1.48	1.77		0.317	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Protactinium-231	0.0000002	U	3.37	3.37		2.78	pCi/g	12/10/20 15:08	12/31/20 10:46	1
		54								
Protactinium-234	0.130	U	0.243	0.243		0.246	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Radium-226	0.310		0.119	0.124	0.200	0.0525	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Radium-228	0.349		0.200	0.204		0.139	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Thallium-208	0.147		0.0638	0.0660		0.0256	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Thorium 228	0.276		0.0908	0.0964		0.0529	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Thorium-232	0.349		0.200	0.204		0.139	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Thorium-234	0.734		0.555	0.562		0.405	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Uranium-235	0.103	U	0.208	0.208		0.469	pCi/g	12/10/20 15:08	12/31/20 10:46	1
Uranium-238	0.734		0.555	0.562		0.405	pCi/g	12/10/20 15:08	12/31/20 10:46	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-010

Lab Sample ID: 160-40665-10

Date Collected: 12/05/20 08:54
Date Received: 12/07/20 08:56

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.477		0.145	0.153		0.0258	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Actinium-227	0.228 U		0.376	0.377		0.245	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Bismuth-212	0.222 U		0.609	0.610		0.480	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Bismuth-214	0.141		0.0832	0.0845		0.0473	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Cesium-137	0.0250 U		0.0611	0.0612	0.0700	0.0483	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-210	0.0876 U		1.41	1.41		1.15	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-212	0.304		0.0828	0.0917		0.0385	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Lead-214	0.283		0.119	0.123		0.0791	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Potassium-40	6.60		1.11	1.30		0.240	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Protactinium-231	0.000 U		0.283	0.283		2.34	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Protactinium-234	0.0769 U		0.248	0.248		0.202	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Radium-226	0.141		0.0832	0.0845	0.200	0.0473	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Radium-228	0.477		0.145	0.153		0.0258	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thallium-208	0.160		0.0458	0.0487		0.0136	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium 228	0.304		0.0828	0.0917		0.0385	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium-232	0.477		0.145	0.153		0.0258	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Thorium-234	-0.513 U		0.881	0.883		0.738	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Uranium-235	0.000 U		0.155	0.155		0.355	pCi/g	12/10/20 15:08	12/31/20 09:30	1
Uranium-238	-0.513 U		0.881	0.883		0.738	pCi/g	12/10/20 15:08	12/31/20 09:30	1

Client Sample ID: HPPG-ESU-TU099B-011

Lab Sample ID: 160-40665-11

Date Collected: 12/05/20 08:55
Date Received: 12/07/20 08:56

Matrix: Solid

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Strontium-90	0.111 U		0.151	0.152	0.331	0.116	pCi/g	12/28/20 17:03	01/06/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	100		40 - 110					12/28/20 17:03	01/06/21 17:37	1
Y Carrier	92.7		40 - 110					12/28/20 17:03	01/06/21 17:37	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.376		0.293	0.295		0.137	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Actinium-227	0.161 U		0.373	0.374		0.335	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Bismuth-212	-0.414 U		0.849	0.850		0.658	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Bismuth-214	0.353		0.117	0.122		0.0495	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Cesium-137	0.00406 U		0.0731	0.0731	0.0700	0.0598	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Lead-210	-0.788 U		1.53	1.53		1.29	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Lead-212	0.380		0.0826	0.0916		0.0364	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Lead-214	0.372		0.109	0.115		0.0547	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Potassium-40	9.03		1.55	1.80		0.222	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Protactinium-231	0.00000011 U		2.45	2.45		2.02	pCi/g	12/10/20 15:08	12/31/20 10:05	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-011

Lab Sample ID: 160-40665-11

Date Collected: 12/05/20 08:55

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Protactinium-234	0.0993	U	0.203	0.203		0.173	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Radium-226	0.353		0.117	0.122	0.200	0.0495	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Radium-228	0.376		0.293	0.295		0.137	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Thallium-208	0.0916		0.0408	0.0419		0.0121	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Thorium 228	0.380		0.0826	0.0916		0.0364	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Thorium-232	0.376		0.293	0.295		0.137	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Thorium-234	0.724		0.492	0.498		0.368	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Uranium-235	0.0796	U	0.351	0.351		0.348	pCi/g	12/10/20 15:08	12/31/20 10:05	1
Uranium-238	0.724		0.492	0.498		0.368	pCi/g	12/10/20 15:08	12/31/20 10:05	1

Client Sample ID: HPPG-ESU-TU099B-012

Lab Sample ID: 160-40665-12

Date Collected: 12/05/20 08:57

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.308		0.162	0.165		0.0623	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Actinium-227	0.228		0.376	0.377		0.217	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Bismuth-212	0.233	U	0.577	0.577		0.450	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Bismuth-214	0.151		0.100	0.102		0.107	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Cesium-137	-0.0201	U	0.0629	0.0630	0.0700	0.0503	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Lead-210	-1.28	U	1.33	1.34		1.48	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Lead-212	0.303		0.0736	0.0834		0.0365	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Lead-214	0.334		0.0949	0.101		0.0368	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Potassium-40	7.32		1.17	1.39		0.277	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Protactinium-231	-0.646	U	2.42	2.43		1.98	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Protactinium-234	0.0158	U	0.0243	0.0243		0.157	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Radium-226	0.151		0.100	0.102	0.200	0.107	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Radium-228	0.308		0.162	0.165		0.0623	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Thallium-208	0.0709		0.0607	0.0611		0.0349	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Thorium 228	0.303		0.0736	0.0834		0.0365	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Thorium-232	0.308		0.162	0.165		0.0623	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Thorium-234	0.174	U	0.396	0.396		0.312	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Uranium-235	0.000	U	0.162	0.162		0.237	pCi/g	12/10/20 15:08	12/31/20 10:07	1
Uranium-238	0.174	U	0.396	0.396		0.312	pCi/g	12/10/20 15:08	12/31/20 10:07	1

Client Sample ID: HPPG-ESU-TU099B-013

Lab Sample ID: 160-40665-13

Date Collected: 12/05/20 09:01

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.191		0.192	0.193		0.0850	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Actinium-227	-0.315	U	0.675	0.676		0.406	pCi/g	12/10/20 15:08	12/31/20 10:04	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-013

Lab Sample ID: 160-40665-13

Date Collected: 12/05/20 09:01

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-212	-0.335	U	0.501	0.502		0.797	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Bismuth-214	0.199		0.111	0.113		0.0691	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Cesium-137	0.00718	U	0.0682	0.0682	0.0700	0.0552	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Lead-210	0.478	U	1.09	1.10		0.758	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Lead-212	0.272		0.0745	0.0824		0.0318	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Lead-214	0.214		0.0920	0.0946		0.0694	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Potassium-40	4.52		1.16	1.25		0.268	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Protactinium-231	0.645	U	1.56	1.57		1.73	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Protactinium-234	-0.0798	U	0.206	0.206		0.166	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Radium-226	0.199		0.111	0.113	0.200	0.0691	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Radium-228	0.191		0.192	0.193		0.0850	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Thallium-208	0.0576		0.0649	0.0652		0.0355	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Thorium 228	0.272		0.0745	0.0824		0.0318	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Thorium-232	0.191		0.192	0.193		0.0850	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Thorium-234	0.260	U	0.479	0.480		0.333	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Uranium-235	0.0768	U	0.203	0.203		0.232	pCi/g	12/10/20 15:08	12/31/20 10:04	1
Uranium-238	0.260	U	0.479	0.480		0.333	pCi/g	12/10/20 15:08	12/31/20 10:04	1

Client Sample ID: HPPG-ESU-TU099B-014

Lab Sample ID: 160-40665-14

Date Collected: 12/05/20 09:05

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.223		0.158	0.160		0.0684	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Actinium-227	0.0116	U	0.418	0.418		0.248	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Bismuth-212	-0.233	U	0.468	0.469		0.424	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Bismuth-214	0.207		0.0730	0.0761		0.0333	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Cesium-137	-0.00248	U	0.0503	0.0503	0.0700	0.0412	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Lead-210	0.0581	U	0.972	0.973		0.798	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Lead-212	0.222		0.0568	0.0637		0.0275	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Lead-214	0.257		0.0764	0.0809		0.0339	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Potassium-40	6.31		1.01	1.20		0.243	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Protactinium-231	0.311	U	1.39	1.39		1.13	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Protactinium-234	0.0515	U	0.148	0.148		0.137	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Radium-226	0.207		0.0730	0.0761	0.200	0.0333	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Radium-228	0.223		0.158	0.160		0.0684	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Thallium-208	0.0801		0.0470	0.0477		0.0223	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Thorium 228	0.222		0.0568	0.0637		0.0275	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Thorium-232	0.223		0.158	0.160		0.0684	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Thorium-234	0.227	U	0.499	0.500		0.355	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Uranium-235	0.0609	U	0.128	0.128		0.254	pCi/g	12/10/20 15:08	12/31/20 10:06	1
Uranium-238	0.227	U	0.499	0.500		0.355	pCi/g	12/10/20 15:08	12/31/20 10:06	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-015
Date Collected: 12/05/20 09:02
Date Received: 12/07/20 08:56

Lab Sample ID: 160-40665-15
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.210		0.0840	0.0867		0.0196	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Actinium-227	0.156	U	0.257	0.257		0.182	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Bismuth-212	0.181	U	0.513	0.514		0.407	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Bismuth-214	0.200		0.0828	0.0853		0.0387	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Cesium-137	-0.0164	U	0.0511	0.0511	0.0700	0.0409	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Lead-210	0.157	U	0.922	0.922		0.750	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Lead-212	0.179		0.0479	0.0532		0.0224	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Lead-214	0.137		0.0716	0.0730		0.0382	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Potassium-40	6.87		0.954	1.19		0.0773	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Protactinium-231	0.000	U	0.238	0.238		1.53	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Protactinium-234	0.0681	U	0.139	0.140		0.128	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Radium-226	0.200		0.0828	0.0853	0.200	0.0387	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Radium-228	0.210		0.0840	0.0867		0.0196	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Thallium-208	0.0651		0.0435	0.0440		0.0207	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Thorium 228	0.179		0.0479	0.0532		0.0224	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Thorium-232	0.210		0.0840	0.0867		0.0196	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Thorium-234	0.389		0.282	0.286		0.193	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Uranium-235	0.000	U	0.0394	0.0394		0.250	pCi/g	12/10/20 15:08	12/31/20 10:08	1
Uranium-238	0.389		0.282	0.286		0.193	pCi/g	12/10/20 15:08	12/31/20 10:08	1

Client Sample ID: HPPG-ESU-TU099B-016

Lab Sample ID: 160-40665-16

Date Collected: 12/05/20 09:03

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.154		0.207	0.207		0.113	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Actinium-227	0.0798	U	0.147	0.147		0.393	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Bismuth-212	0.371	U	0.658	0.659		0.497	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Bismuth-214	0.0454	U	0.147	0.148		0.118	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Cesium-137	0.00253	U	0.0545	0.0545	0.0700	0.0446	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-210	-0.0887	U	1.44	1.44		1.18	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-212	0.260		0.0857	0.0921		0.0508	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-214	0.484		0.120	0.130		0.0408	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Potassium-40	6.29		1.27	1.42		0.258	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Protactinium-231	0.000	U	0.340	0.340		2.01	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Protactinium-234	-0.113	U	0.303	0.303		0.246	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Radium-226	0.0454	U	0.147	0.148	0.200	0.118	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Radium-228	0.154		0.207	0.207		0.113	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thallium-208	0.0236	U	0.0489	0.0490		0.0487	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium 228	0.260		0.0857	0.0921		0.0508	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium-232	0.154		0.207	0.207		0.113	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium-234	-0.216	U	1.10	1.10		0.913	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Uranium-235	0.126	U	0.242	0.242		0.451	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Uranium-238	-0.216	U	1.10	1.10		0.913	pCi/g	12/10/20 15:08	12/31/20 10:09	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-017

Lab Sample ID: 160-40665-17

Matrix: Solid

Date Collected: 12/05/20 09:15
Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.770		0.177	0.198		0.0360	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Actinium-227	0.262	U	0.573	0.574		0.343	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Bismuth-212	1.26		0.503	0.524		0.117	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Bismuth-214	0.390		0.153	0.159		0.0652	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Cesium-137	0.0419	U	0.0774	0.0776	0.0700	0.0599	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-210	0.958	U	1.91	1.91		1.22	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-212	0.454		0.101	0.114		0.0485	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Lead-214	0.492		0.152	0.163		0.0665	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Potassium-40	9.30		1.55	1.88		0.318	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Protactinium-231	0.198	U	1.65	1.65		2.56	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Protactinium-234	0.126	U	0.325	0.326		0.265	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Radium-226	0.390		0.153	0.159	0.200	0.0652	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Radium-228	0.770		0.177	0.198		0.0360	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thallium-208	0.130		0.104	0.105		0.0450	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium 228	0.454		0.101	0.114		0.0485	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium-232	0.770		0.177	0.198		0.0360	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Thorium-234	0.443		0.568	0.571		0.435	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Uranium-235	0.106	U	0.268	0.268		0.477	pCi/g	12/10/20 15:08	12/31/20 10:09	1
Uranium-238	0.443		0.568	0.571		0.435	pCi/g	12/10/20 15:08	12/31/20 10:09	1

Client Sample ID: HPPG-ESU-TU099B-018

Lab Sample ID: 160-40665-18

Matrix: Solid

Date Collected: 12/05/20 09:06
Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.296		0.215	0.217		0.0994	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Actinium-227	0.0660	U	0.420	0.420		0.279	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Bismuth-212	0.323	U	0.593	0.594		0.454	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Bismuth-214	0.269		0.0906	0.0948		0.0380	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Cesium-137	-0.0421	U	0.0722	0.0724	0.0700	0.0565	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Lead-210	1.91		1.11	1.13		0.675	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Lead-212	0.273		0.0748	0.0828		0.0401	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Lead-214	0.203		0.0929	0.0952		0.0486	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Potassium-40	6.70		1.13	1.33		0.247	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Protactinium-231	-0.738	U	2.32	2.32		1.88	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Protactinium-234	-0.0874	U	0.201	0.202		0.224	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Radium-226	0.269		0.0906	0.0948	0.200	0.0380	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Radium-228	0.296		0.215	0.217		0.0994	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Thallium-208	0.130		0.0422	0.0443		0.0140	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Thorium 228	0.273		0.0748	0.0828		0.0401	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Thorium-232	0.296		0.215	0.217		0.0994	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Thorium-234	-0.652	U	0.656	0.660		0.730	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Uranium-235	0.134	U	0.413	0.413		0.344	pCi/g	12/10/20 15:08	12/31/20 10:34	1
Uranium-238	-0.652	U	0.656	0.660		0.730	pCi/g	12/10/20 15:08	12/31/20 10:34	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-019

Lab Sample ID: 160-40665-19

Date Collected: 12/05/20 09:07

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.292		0.193	0.196		0.108	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Actinium-227	-0.285	U	0.563	0.564		0.338	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Bismuth-212	0.000	U	0.473	0.473		0.384	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Bismuth-214	0.246		0.103	0.106		0.0476	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Cesium-137	-0.0210	U	0.0709	0.0709	0.0700	0.0564	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Lead-210	-1.55	U	1.48	1.50		1.51	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Lead-212	0.243		0.0712	0.0756		0.0371	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Lead-214	0.263		0.0961	0.0997		0.0423	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Potassium-40	7.14		1.37	1.54		0.216	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Protactinium-231	0.315	U	1.00	1.00		1.57	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Protactinium-234	0.0842	U	0.192	0.192		0.189	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Radium-226	0.246		0.103	0.106	0.200	0.0476	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Radium-228	0.292		0.193	0.196		0.108	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Thallium-208	0.0997		0.0480	0.0491		0.0186	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Thorium 228	0.243		0.0712	0.0756		0.0371	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Thorium-232	0.292		0.193	0.196		0.108	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Thorium-234	0.130	U	0.430	0.430		0.356	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Uranium-235	-0.00182	U	0.337	0.337		0.277	pCi/g	12/10/20 15:08	12/31/20 10:39	1
Uranium-238	0.130	U	0.430	0.430		0.356	pCi/g	12/10/20 15:08	12/31/20 10:39	1

Client Sample ID: HPPG-ESU-TU099B-020

Lab Sample ID: 160-40665-20

Date Collected: 12/05/20 09:09

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.310		0.211	0.213		0.0958	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Actinium-227	-0.140	U	0.444	0.444		0.276	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Bismuth-212	-0.0379	U	0.709	0.709		0.405	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Bismuth-214	0.148		0.0820	0.0835		0.135	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Cesium-137	0.00184	U	0.0337	0.0337	0.0700	0.0275	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Lead-210	-1.79	U	1.23	1.25		1.35	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Lead-212	0.273		0.0680	0.0766		0.0341	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Lead-214	0.285		0.0910	0.0957		0.0402	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Potassium-40	6.50		1.07	1.26		0.260	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Protactinium-231	0.564	U	1.53	1.53		1.68	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Protactinium-234	-0.0154	U	0.153	0.153		0.126	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Radium-226	0.148		0.0820	0.0835	0.200	0.135	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Radium-228	0.310		0.211	0.213		0.0958	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Thallium-208	0.0712		0.0570	0.0575		0.0277	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Thorium 228	0.273		0.0680	0.0766		0.0341	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Thorium-232	0.310		0.211	0.213		0.0958	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Thorium-234	0.550		0.418	0.423		0.278	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Uranium-235	0.127	U	0.227	0.227		0.190	pCi/g	12/10/20 15:08	12/31/20 10:42	1
Uranium-238	0.550		0.418	0.423		0.278	pCi/g	12/10/20 15:08	12/31/20 10:42	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-021

Lab Sample ID: 160-40665-21

Date Collected: 12/05/20 09:12

Matrix: Solid

Date Received: 12/07/20 08:56

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	-0.162	U	0.137	0.137	0.331	0.126	pCi/g	12/28/20 17:03	01/06/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	99.5		40 - 110					12/28/20 17:03	01/06/21 17:37	1
Y Carrier	90.5		40 - 110					12/28/20 17:03	01/06/21 17:37	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.471		0.222	0.227		0.0781	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Actinium-227	0.0986	U	0.345	0.345		0.330	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Bismuth-212	0.240	U	0.443	0.443		0.316	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Bismuth-214	0.205		0.121	0.123		0.0700	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Cesium-137	0.00660	U	0.0575	0.0576	0.0700	0.0464	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Lead-210	-0.505	U	1.12	1.12		0.826	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Lead-212	0.240		0.0692	0.0758		0.0317	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Lead-214	0.182		0.0949	0.0967		0.102	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Potassium-40	2.85		1.11	1.15		0.418	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Protactinium-231	0.000	U	0.176	0.176		1.73	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Protactinium-234	0.0202	U	0.0404	0.0404		0.136	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Radium-226	0.205		0.121	0.123	0.200	0.0700	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Radium-228	0.471		0.222	0.227		0.0781	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Thallium-208	0.0602		0.0669	0.0672		0.0368	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Thorium 228	0.240		0.0692	0.0758		0.0317	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Thorium-232	0.471		0.222	0.227		0.0781	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Thorium-234	-0.116	U	0.691	0.691		0.572	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Uranium-235	0.125	U	0.230	0.230		0.221	pCi/g	12/10/20 15:08	12/31/20 10:36	1
Uranium-238	-0.116	U	0.691	0.691		0.572	pCi/g	12/10/20 15:08	12/31/20 10:36	1

Client Sample ID: HPPG-ESU-TU099B-022

Lab Sample ID: 160-40665-22

Date Collected: 12/05/20 09:13

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.113		0.0998	0.100		0.0421	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Actinium-227	0.126	U	0.282	0.282		0.153	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Bismuth-212	-0.0504	U	0.354	0.354		0.333	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Bismuth-214	0.0936		0.0524	0.0533		0.0289	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Cesium-137	-0.0116	U	0.0361	0.0361	0.0700	0.0285	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Lead-210	-0.494	U	1.09	1.09		0.877	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Lead-212	0.115		0.0448	0.0472		0.0267	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Lead-214	0.126		0.0561	0.0576		0.0320	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Potassium-40	5.59		0.885	1.05		0.211	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Protactinium-231	-0.518	U	1.65	1.65		1.34	pCi/g	12/10/20 15:08	12/31/20 10:43	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-022

Lab Sample ID: 160-40665-22

Date Collected: 12/05/20 09:13

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Protactinium-234	0.0109	U	0.0466	0.0466		0.123	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Radium-226	0.0936		0.0524	0.0533	0.200	0.0289	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Radium-228	0.113		0.0998	0.100		0.0421	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Thallium-208	0.0446		0.0285	0.0289		0.0134	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Thorium 228	0.115		0.0448	0.0472		0.0267	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Thorium-232	0.113		0.0998	0.100		0.0421	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Thorium-234	0.000	U	0.0864	0.0864		0.497	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Uranium-235	0.000	U	0.0637	0.0637		0.213	pCi/g	12/10/20 15:08	12/31/20 10:43	1
Uranium-238	0.000	U	0.0864	0.0864		0.497	pCi/g	12/10/20 15:08	12/31/20 10:43	1

Client Sample ID: HPPG-ESU-TU099B-023

Lab Sample ID: 160-40665-23

Date Collected: 12/05/20 09:16

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.0765		0.130	0.131		0.0687	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Actinium-227	-0.210	U	0.404	0.405		0.233	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Bismuth-212	0.278	U	0.539	0.539		0.422	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Bismuth-214	0.171		0.0677	0.0700		0.0310	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Cesium-137	-0.00237	U	0.0388	0.0388	0.0700	0.0318	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Lead-210	0.802		0.707	0.713		0.527	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Lead-212	0.137		0.0446	0.0480		0.0249	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Lead-214	0.165		0.0570	0.0596		0.0275	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Potassium-40	3.85		0.680	0.785		0.0700	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Protactinium-231	0.364	U	1.06	1.06		1.15	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Protactinium-234	0.0549	U	0.137	0.137		0.117	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Radium-226	0.171		0.0677	0.0700	0.200	0.0310	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Radium-228	0.0765		0.130	0.131		0.0687	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Thallium-208	0.0340		0.0425	0.0427		0.0209	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Thorium 228	0.137		0.0446	0.0480		0.0249	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Thorium-232	0.0765		0.130	0.131		0.0687	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Thorium-234	0.000	U	0.220	0.220		0.594	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Uranium-235	0.0518	U	0.141	0.141		0.203	pCi/g	12/10/20 15:08	12/31/20 10:45	1
Uranium-238	0.000	U	0.220	0.220		0.594	pCi/g	12/10/20 15:08	12/31/20 10:45	1

Client Sample ID: HPPG-ESU-TU099B-024

Lab Sample ID: 160-40665-24

Date Collected: 12/05/20 09:18

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.157	U	0.209	0.210		0.168	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Actinium-227	0.167	U	0.382	0.383		0.364	pCi/g	12/10/20 15:08	12/31/20 14:52	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-024

Lab Sample ID: 160-40665-24

Date Collected: 12/05/20 09:18

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-212	0.137	U	0.654	0.654		0.522	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Bismuth-214	0.105	U	0.113	0.114		0.195	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Cesium-137	-0.0187	U	0.0667	0.0668	0.0700	0.0532	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Lead-210	-0.924	U	1.76	1.77		1.49	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Lead-212	0.318		0.0947	0.102		0.0555	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Lead-214	0.370		0.139	0.145		0.0639	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Potassium-40	6.68		1.28	1.49		0.296	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Protactinium-231	0.751	U	2.28	2.28		1.85	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Protactinium-234	0.0663	U	0.0907	0.0910		0.270	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Radium-226	0.105	U	0.113	0.114	0.200	0.195	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Radium-228	0.157	U	0.209	0.210		0.168	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Thallium-208	0.139		0.0652	0.0671		0.0294	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Thorium 228	0.318		0.0947	0.102		0.0555	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Thorium-232	0.157	U	0.209	0.210		0.168	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Thorium-234	-0.151	U	0.954	0.954		0.788	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Uranium-235	0.0898	U	0.180	0.180		0.503	pCi/g	12/10/20 15:08	12/31/20 14:52	1
Uranium-238	-0.151	U	0.954	0.954		0.788	pCi/g	12/10/20 15:08	12/31/20 14:52	1

Client Sample ID: HPPG-ESU-TU099B-025

Lab Sample ID: 160-40665-25

Date Collected: 12/05/20 09:21

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.407		0.166	0.171		0.0395	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Actinium-227	0.0407	U	0.499	0.499		0.308	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Bismuth-212	-0.00422	U	0.727	0.727		0.563	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Bismuth-214	0.235		0.134	0.137		0.0749	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Cesium-137	-0.0186	U	0.0585	0.0585	0.0700	0.0527	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Lead-210	0.382	U	0.896	0.897		0.650	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Lead-212	0.285		0.0807	0.0888		0.0390	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Lead-214	0.299		0.112	0.116		0.0743	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Potassium-40	6.28		1.69	1.81		0.587	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Protactinium-231	0.404	U	1.78	1.78		1.87	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Protactinium-234	0.0841	U	0.218	0.219		0.140	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Radium-226	0.235		0.134	0.137	0.200	0.0749	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Radium-228	0.407		0.166	0.171		0.0395	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Thallium-208	0.0923		0.0709	0.0716		0.0304	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Thorium 228	0.285		0.0807	0.0888		0.0390	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Thorium-232	0.407		0.166	0.171		0.0395	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Thorium-234	0.531		0.446	0.450		0.357	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Uranium-235	-0.0397	U	0.250	0.250		0.225	pCi/g	12/10/20 15:48	12/31/20 07:36	1
Uranium-238	0.531		0.446	0.450		0.357	pCi/g	12/10/20 15:48	12/31/20 07:36	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-ESU-TU099B-B-001

Lab Sample ID: 160-40665-26

Matrix: Solid

Date Collected: 12/05/20 08:53
Date Received: 12/07/20 08:56

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.0586	U	0.133	0.133	0.331	0.104	pCi/g	12/28/20 17:03	01/06/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	102		40 - 110					12/28/20 17:03	01/06/21 17:37	1
Y Carrier	87.9		40 - 110					12/28/20 17:03	01/06/21 17:37	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.455		0.172	0.178		0.0360	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Actinium-227	-0.135	U	0.596	0.597		0.349	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Bismuth-212	-0.272	U	0.823	0.823		0.651	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Bismuth-214	0.334		0.128	0.133		0.0561	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Cesium-137	0.0433	U	0.0693	0.0695	0.0700	0.0529	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Lead-210	-0.0255	U	1.62	1.62		1.33	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Lead-212	0.289		0.0922	0.0995		0.0548	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Lead-214	0.267		0.122	0.125		0.0549	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Potassium-40	8.27		1.47	1.70		0.268	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Protactinium-231	0.000	U	0.768	0.768		2.24	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Protactinium-234	-0.117	U	0.326	0.326		0.265	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Radium-226	0.334		0.128	0.133	0.200	0.0561	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Radium-228	0.455		0.172	0.178		0.0360	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Thallium-208	0.0938		0.0469	0.0479		0.0436	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Thorium 228	0.289		0.0922	0.0995		0.0548	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Thorium-232	0.455		0.172	0.178		0.0360	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Thorium-234	-0.458	U	1.26	1.26		1.04	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Uranium-235	0.172	U	0.498	0.499		0.405	pCi/g	12/10/20 15:48	12/31/20 07:38	1
Uranium-238	-0.458	U	1.26	1.26		1.04	pCi/g	12/10/20 15:48	12/31/20 07:38	1

Client Sample ID: HPPG-F-053

Lab Sample ID: 160-40665-27

Date Collected: 12/05/20 09:06
Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.392		0.166	0.171		0.0558	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Actinium-227	-0.0917	U	0.515	0.515		0.317	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Bismuth-212	0.406	U	0.781	0.782		0.612	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Bismuth-214	0.192		0.102	0.104		0.0524	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Cesium-137	-0.0173	U	0.0610	0.0610	0.0700	0.0489	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-210	0.907		1.36	1.37		0.857	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-212	0.358		0.0800	0.0924		0.0395	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-214	0.302		0.0973	0.102		0.0554	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Potassium-40	6.69		1.12	1.31		0.240	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Protactinium-231	-0.607	U	2.30	2.30		1.87	pCi/g	12/10/20 15:48	12/31/20 07:39	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Client Sample ID: HPPG-F-053

Lab Sample ID: 160-40665-27

Date Collected: 12/05/20 09:06

Matrix: Solid

Date Received: 12/07/20 08:56

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Protactinium-234	0.0437	U	0.0767	0.0768		0.222	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Radium-226	0.192		0.102	0.104	0.200	0.0524	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Radium-228	0.392		0.166	0.171		0.0558	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thallium-208	0.0256	U	0.0736	0.0737		0.0420	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium 228	0.358		0.0800	0.0924		0.0395	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium-232	0.392		0.166	0.171		0.0558	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium-234	-0.974	U	0.637	0.646		0.787	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Uranium-235	-0.159	U	0.547	0.547		0.447	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Uranium-238	-0.974	U	0.637	0.646		0.787	pCi/g	12/10/20 15:48	12/31/20 07:39	1

Client Sample ID: HPPG-F-054

Lab Sample ID: 160-40665-28

Date Collected: 12/05/20 09:12

Matrix: Solid

Date Received: 12/07/20 08:56

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	-0.0309	U	0.138	0.138	0.331	0.116	pCi/g	12/28/20 17:03	01/06/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	96.8		40 - 110					12/28/20 17:03	01/06/21 17:38	1
Y Carrier	93.1		40 - 110					12/28/20 17:03	01/06/21 17:38	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.142	U	0.242	0.243		0.175	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Actinium-227	0.0970	U	0.543	0.543		0.334	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Bismuth-212	-0.617	U	1.06	1.07		0.833	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Bismuth-214	0.0459	U	0.100	0.101		0.115	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Cesium-137	0.0277	U	0.0611	0.0611	0.0700	0.0475	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-210	1.13		1.39	1.40		0.909	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-212	0.272		0.0801	0.0863		0.0435	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Lead-214	0.284		0.0938	0.0993		0.0548	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Potassium-40	6.86		1.26	1.49		0.283	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Protactinium-231	0.000	U	0.732	0.732		2.05	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Protactinium-234	0.199	U	0.115	0.117		0.236	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Radium-226	0.0459	U	0.100	0.101	0.200	0.115	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Radium-228	0.142	U	0.242	0.243		0.175	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thallium-208	0.0590		0.0666	0.0670		0.0364	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium 228	0.272		0.0801	0.0863		0.0435	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium-232	0.142	U	0.242	0.243		0.175	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Thorium-234	0.532		0.540	0.544		0.392	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Uranium-235	0.113	U	0.414	0.414		0.385	pCi/g	12/10/20 15:48	12/31/20 07:39	1
Uranium-238	0.532		0.540	0.544		0.392	pCi/g	12/10/20 15:48	12/31/20 07:39	1

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QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-40665-1
SDG: GJ46599748

Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-493201/23-A

Matrix: Solid

Analysis Batch: 494113

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 493201

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Strontium-90	0.09294			0.122	0.123	0.331	pCi/g	12/28/20 17:03	01/06/21 17:30	1
Carrier										
Sr Carrier	103	MB	MB	%Yield	Qualifier	Limits				
						40 - 110				
Y Carrier	90.5	MB	MB	%Yield	Qualifier	Limits				
						40 - 110				

Lab Sample ID: LCS 160-493201/1-A

Matrix: Solid

Analysis Batch: 494114

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 493201

Analyte	Spike Added	LCS Result	LCS Qual	Count	Total	DLC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)	Uncert. (2σ+/-)				
Strontium-90	7.75	6.744		0.728	0.728	0.331	pCi/g	87	75 - 125
Carrier									
Sr Carrier	100	MB	MB	%Yield	Qualifier	Limits			
						40 - 110			
Y Carrier	85.6	MB	MB	%Yield	Qualifier	Limits			
						40 - 110			

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-491419/1-A

Matrix: Solid

Analysis Batch: 494671

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491419

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Actinium 228	0.04811	U		0.0605	0.0607		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Actinium-227	0.09449	U		0.200	0.201		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Bismuth-212	0.0000	U		0.133	0.133		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Bismuth-214	-0.04255	U		0.107	0.107		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Cesium-137	-0.03704	U		0.0745	0.0746	0.0700	pCi/g	12/10/20 14:21	01/12/21 11:37	1
Lead-210	-1.572	U		1.93	1.94		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Lead-212	-0.02188	U		0.0566	0.0566		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Lead-214	0.01924	U		0.127	0.127		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Potassium-40	0.6795			0.661	0.664		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Protactinium-231	0.4781	U		1.65	1.65		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Protactinium-234	-0.05901	U		0.207	0.207		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Radium-226	-0.04255	U		0.107	0.107	0.200	pCi/g	12/10/20 14:21	01/12/21 11:37	1
Radium-228	0.04811	U		0.0605	0.0607		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Thallium-208	0.01311	U		0.0448	0.0448		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Thorium 228	-0.02188	U		0.0566	0.0566		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Thorium-232	0.04811	U		0.0605	0.0607		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Thorium-234	0.3659			0.528	0.529		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Uranium-235	-0.002215	U		0.00610	0.00610		pCi/g	12/10/20 14:21	01/12/21 11:37	1
Uranium-238	0.3659			0.528	0.529		pCi/g	12/10/20 14:21	01/12/21 11:37	1

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QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-491419/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 494672

Prep Batch: 491419

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		%Rec.	Limits
		Result	Qual		LOQ	DLC		
Americium-241	96.4	97.01		10.2		0.573	pCi/g	101 87 - 116
Cesium-137	26.7	26.43		2.82	0.0700	0.0940	pCi/g	99 87 - 120
Cobalt-60	9.37	9.048		0.958		0.0270	pCi/g	97 87 - 115

Lab Sample ID: 160-40665-4 DU

Client Sample ID: HPPG-ESU-TU099B-004

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 494662

Prep Batch: 491419

Analyte	Sample		DU		Uncert. (2σ+/-)	Total		RER	Limit
	Result	Qual	Result	Qual		LOQ	DLC		
Actinium 228	0.0589	U	0.2868		0.181		0.0784	pCi/g	0.57 1
Actinium-227	0.166	U	-0.1710	U	0.497		0.290	pCi/g	0.44 1
Bismuth-212	-0.0232	U	0.3548	U	0.617		0.480	pCi/g	0.26 1
Bismuth-214	0.306		0.2524		0.0814		0.0302	pCi/g	0.28 1
Cesium-137	-0.0660	U	-0.00076	U	0.0464	0.0700	0.0382	pCi/g	0.45 1
Lead-210	-0.0320	U	0.1734	U	0.917		0.745	pCi/g	0.08 1
Lead-212	0.0291	U	0.03536	U	0.0832		0.0669	pCi/g	0.04 1
Lead-214	0.200		0.2268		0.0760		0.0351	pCi/g	0.13 1
Potassium-40	7.63		7.000		1.34		0.277	pCi/g	0.21 1
Protactinium-231	0.589	U	0.0000	U	0.550		1.42	pCi/g	0.26 1
Protactinium-234	0.327		0.06758	U	0.182		0.166	pCi/g	0.68 1
Radium-226	0.306		0.2524		0.0814	0.200	0.0302	pCi/g	0.28 1
Radium-228	0.0589	U	0.2868		0.181		0.0784	pCi/g	0.57 1
Thallium-208	0.197		0.1107		0.0325		0.00495	pCi/g	0.97 1
Thorium 228	0.0291	U	0.03536	U	0.0832		0.0669	pCi/g	0.04 1
Thorium-232	0.0589	U	0.2868		0.181		0.0784	pCi/g	0.57 1
Thorium-234	0.568		0.1996	U	0.470		0.621	pCi/g	0.38 1
Uranium-235	0.0958	U	-0.1591	U	0.417		0.339	pCi/g	0.42 1
Uranium-238	0.568		0.1996	U	0.470		0.621	pCi/g	0.38 1

Lab Sample ID: MB 160-491421/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 493541

Prep Batch: 491421

Analyte	MB		Count Uncert. (2σ+/-)	Total		Prepared	Analyzed	Dil Fac
	Result	MB Qualifier		Uncert. (2σ+/-)	LOQ	DLC	Unit	
Actinium 228	0.1139		0.0930	0.0937		0.0490	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Actinium-227	-0.1490	U	0.466	0.466		0.279	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Bismuth-212	0.4888	U	1.13	1.13		0.883	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Bismuth-214	-0.05207	U	0.137	0.137		0.183	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Cesium-137	0.01489	U	0.0886	0.0886	0.0700	0.0715	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Lead-210	0.5971	U	1.44	1.45		1.04	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Lead-212	-0.06872	U	0.0713	0.0717		0.102	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Lead-214	0.01064	U	0.0973	0.0973		0.0778	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Potassium-40	-0.1884	U	0.549	0.550		0.298	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Protactinium-231	-0.7532	U	2.22	2.22		1.79	pCi/g	12/10/20 15:08 12/31/20 09:23 1
Protactinium-234	0.04741	U	0.150	0.150		0.120	pCi/g	12/10/20 15:08 12/31/20 09:23 1

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QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-491421/1-A

Matrix: Solid

Analysis Batch: 493541

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491421

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)	LOQ	Unit					
Radium-226	-0.05207	U		0.137	0.137	0.200	pCi/g	0.183	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Radium-228	0.1139			0.0930	0.0937		pCi/g	0.0490	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thallium-208	-0.01823	U		0.0496	0.0497		pCi/g	0.0477	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium 228	-0.06872	U		0.0713	0.0717		pCi/g	0.102	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium-232	0.1139			0.0930	0.0937		pCi/g	0.0490	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Thorium-234	-0.6464	U		0.644	0.648		pCi/g	0.562	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Uranium-235	0.07354	U		0.228	0.228		pCi/g	0.177	pCi/g	12/10/20 15:08	12/31/20 09:23	1
Uranium-238	-0.6464	U		0.644	0.648		pCi/g	0.562	pCi/g	12/10/20 15:08	12/31/20 09:23	1

Lab Sample ID: LCS 160-491421/2-A

Matrix: Solid

Analysis Batch: 493542

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 491421

Analyte	Spike Added	LCS Result	LCS Qual	Total			DLC	Unit	%Rec	Limits
				Uncert. (2σ+/-)	LOQ	%Rec.				
Americium-241	96.4	97.09		10.2			0.587	pCi/g	101	87 - 116
Cesium-137	26.7	26.39		2.82	0.0700		0.0962	pCi/g	99	87 - 120
Cobalt-60	9.41	9.089		0.962			0.0274	pCi/g	97	87 - 115

Lab Sample ID: 160-40665-24 DU

Matrix: Solid

Analysis Batch: 493544

Client Sample ID: HPPG-ESU-TU099B-024

Prep Type: Total/NA

Prep Batch: 491421

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total			DLC	Unit	RER	Limit
					Uncert. (2σ+/-)	LOQ	RER				
Actinium 228	0.157	U			0.2102	0.173		0.0790	pCi/g	0.14	1
Actinium-227	0.167	U			0.05595	0.0870		0.294	pCi/g	0.24	1
Bismuth-212	0.137	U			0.2466	0.443		0.337	pCi/g	0.1	1
Bismuth-214	0.105	U			0.3377	0.105		0.0372	pCi/g	1.06	1
Cesium-137	-0.0187	U			0.01713	0.0483	0.0700	0.0383	pCi/g	0.31	1
Lead-210	-0.924	U			0.4276	1.01		0.807	pCi/g	0.49	1
Lead-212	0.318				0.2425	0.0648		0.0266	pCi/g	0.45	1
Lead-214	0.370				0.2522	0.0780		0.0397	pCi/g	0.53	1
Potassium-40	6.68				6.958	1.25		0.229	pCi/g	0.10	1
Protactinium-231	0.751	U			-0.6107	1.88		1.53	pCi/g	0.33	1
Protactinium-234	0.0663	U			0.06137	0.189		0.153	pCi/g	0.02	1
Radium-226	0.105	U			0.3377	0.105	0.200	0.0372	pCi/g	1.06	1
Radium-228	0.157	U			0.2102	0.173		0.0790	pCi/g	0.14	1
Thallium-208	0.139				0.07764	0.0298		0.00970	pCi/g	0.64	1
Thorium 228	0.318				0.2425	0.0648		0.0266	pCi/g	0.45	1
Thorium-232	0.157	U			0.2102	0.173		0.0790	pCi/g	0.14	1
Thorium-234	-0.151	U			0.02118	0.282		0.747	pCi/g	0.14	1
Uranium-235	0.0898	U			-0.02534	0.0455		0.343	pCi/g	0.51	1
Uranium-238	-0.151	U			0.02118	0.282		0.747	pCi/g	0.14	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-491424/1-A

Matrix: Solid

Analysis Batch: 493541

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 491424

Analyte	MB	MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Uncert.		(2σ+/-)	Uncert.						
Actinium 228	0.1070			0.175	0.176		0.106	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Actinium-227	-0.1769	U		0.469	0.470		0.279	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Bismuth-212	0.0000	U		0.189	0.189		0.380	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Bismuth-214	0.07153	U		0.0797	0.0801		0.135	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Cesium-137	0.04211	U		0.0919	0.0920	0.0700	0.0715	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Lead-210	0.6634	U		1.51	1.52		1.04	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Lead-212	-0.02147	U		0.0718	0.0719		0.0901	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Lead-214	0.01064	U		0.0952	0.0952		0.0761	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Potassium-40	-0.4193	U		0.644	0.645		0.723	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Protactinium-231	-0.6875	U		2.16	2.16		1.74	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Protactinium-234	0.04681	U		0.148	0.148		0.120	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Radium-226	0.07153	U		0.0797	0.0801	0.200	0.135	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Radium-228	0.1070			0.175	0.176		0.106	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Thallium-208	-0.05075	U		0.0986	0.0987		0.0533	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Thorium 228	-0.02147	U		0.0718	0.0719		0.0901	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Thorium-232	0.1070			0.175	0.176		0.106	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Thorium-234	0.4510			0.484	0.487		0.366	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Uranium-235	-0.1627	U		0.224	0.224		0.298	pCi/g	12/10/20 15:48	12/31/20 07:37	1
Uranium-238	0.4510			0.484	0.487		0.366	pCi/g	12/10/20 15:48	12/31/20 07:37	1

Lab Sample ID: LCS 160-491424/2-A

Matrix: Solid

Analysis Batch: 493543

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 491424

Analyte	Spike	LCS	LCS	Qual	Total	Uncert.	(2σ+/-)	LOQ	DLC	Unit	%Rec	Limits
	Added	Result	Uncert.		Uncert.							
Americium-241	96.4	92.17			9.67				0.506	pCi/g	96	87 - 116
Cesium-137	26.7	26.28			2.79		0.0700		0.0604	pCi/g	98	87 - 120
Cobalt-60	9.41	8.857			0.933				0.0510	pCi/g	94	87 - 115

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Rad

Leach Batch: 491158

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-1	HPPG-ESU-TU099B-001	Total/NA	Solid	Dry and Grind	
160-40665-2	HPPG-ESU-TU099B-002	Total/NA	Solid	Dry and Grind	
160-40665-3	HPPG-ESU-TU099B-003	Total/NA	Solid	Dry and Grind	
160-40665-4	HPPG-ESU-TU099B-004	Total/NA	Solid	Dry and Grind	
160-40665-5	HPPG-ESU-TU099B-005	Total/NA	Solid	Dry and Grind	
160-40665-6	HPPG-ESU-TU099B-006	Total/NA	Solid	Dry and Grind	
160-40665-7	HPPG-ESU-TU099B-007	Total/NA	Solid	Dry and Grind	
160-40665-8	HPPG-ESU-TU099B-008	Total/NA	Solid	Dry and Grind	
160-40665-9	HPPG-ESU-TU099B-009	Total/NA	Solid	Dry and Grind	
160-40665-10	HPPG-ESU-TU099B-010	Total/NA	Solid	Dry and Grind	
160-40665-11	HPPG-ESU-TU099B-011	Total/NA	Solid	Dry and Grind	
160-40665-12	HPPG-ESU-TU099B-012	Total/NA	Solid	Dry and Grind	
160-40665-4 DU	HPPG-ESU-TU099B-004	Total/NA	Solid	Dry and Grind	

Leach Batch: 491164

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-13	HPPG-ESU-TU099B-013	Total/NA	Solid	Dry and Grind	
160-40665-14	HPPG-ESU-TU099B-014	Total/NA	Solid	Dry and Grind	
160-40665-15	HPPG-ESU-TU099B-015	Total/NA	Solid	Dry and Grind	
160-40665-16	HPPG-ESU-TU099B-016	Total/NA	Solid	Dry and Grind	
160-40665-17	HPPG-ESU-TU099B-017	Total/NA	Solid	Dry and Grind	
160-40665-18	HPPG-ESU-TU099B-018	Total/NA	Solid	Dry and Grind	
160-40665-19	HPPG-ESU-TU099B-019	Total/NA	Solid	Dry and Grind	
160-40665-20	HPPG-ESU-TU099B-020	Total/NA	Solid	Dry and Grind	
160-40665-21	HPPG-ESU-TU099B-021	Total/NA	Solid	Dry and Grind	
160-40665-22	HPPG-ESU-TU099B-022	Total/NA	Solid	Dry and Grind	
160-40665-23	HPPG-ESU-TU099B-023	Total/NA	Solid	Dry and Grind	
160-40665-24	HPPG-ESU-TU099B-024	Total/NA	Solid	Dry and Grind	
160-40665-25	HPPG-ESU-TU099B-025	Total/NA	Solid	Dry and Grind	
160-40665-26	HPPG-ESU-TU099B-B-001	Total/NA	Solid	Dry and Grind	
160-40665-27	HPPG-F-053	Total/NA	Solid	Dry and Grind	
160-40665-28	HPPG-F-054	Total/NA	Solid	Dry and Grind	
160-40665-24 DU	HPPG-ESU-TU099B-024	Total/NA	Solid	Dry and Grind	

Prep Batch: 491419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-1	HPPG-ESU-TU099B-001	Total/NA	Solid	Fill_Geo-21	491158
160-40665-2	HPPG-ESU-TU099B-002	Total/NA	Solid	Fill_Geo-21	491158
160-40665-3	HPPG-ESU-TU099B-003	Total/NA	Solid	Fill_Geo-21	491158
160-40665-4	HPPG-ESU-TU099B-004	Total/NA	Solid	Fill_Geo-21	491158
MB 160-491419/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-491419/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40665-4 DU	HPPG-ESU-TU099B-004	Total/NA	Solid	Fill_Geo-21	491158

Prep Batch: 491421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-5	HPPG-ESU-TU099B-005	Total/NA	Solid	Fill_Geo-21	491158
160-40665-6	HPPG-ESU-TU099B-006	Total/NA	Solid	Fill_Geo-21	491158
160-40665-7	HPPG-ESU-TU099B-007	Total/NA	Solid	Fill_Geo-21	491158
160-40665-8	HPPG-ESU-TU099B-008	Total/NA	Solid	Fill_Geo-21	491158
160-40665-9	HPPG-ESU-TU099B-009	Total/NA	Solid	Fill_Geo-21	491158

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-40665-1
SDG: GJ46599748

Rad (Continued)

Prep Batch: 491421 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-10	HPPG-ESU-TU099B-010	Total/NA	Solid	Fill_Geo-21	491158
160-40665-11	HPPG-ESU-TU099B-011	Total/NA	Solid	Fill_Geo-21	491158
160-40665-12	HPPG-ESU-TU099B-012	Total/NA	Solid	Fill_Geo-21	491158
160-40665-13	HPPG-ESU-TU099B-013	Total/NA	Solid	Fill_Geo-21	491164
160-40665-14	HPPG-ESU-TU099B-014	Total/NA	Solid	Fill_Geo-21	491164
160-40665-15	HPPG-ESU-TU099B-015	Total/NA	Solid	Fill_Geo-21	491164
160-40665-16	HPPG-ESU-TU099B-016	Total/NA	Solid	Fill_Geo-21	491164
160-40665-17	HPPG-ESU-TU099B-017	Total/NA	Solid	Fill_Geo-21	491164
160-40665-18	HPPG-ESU-TU099B-018	Total/NA	Solid	Fill_Geo-21	491164
160-40665-19	HPPG-ESU-TU099B-019	Total/NA	Solid	Fill_Geo-21	491164
160-40665-20	HPPG-ESU-TU099B-020	Total/NA	Solid	Fill_Geo-21	491164
160-40665-21	HPPG-ESU-TU099B-021	Total/NA	Solid	Fill_Geo-21	491164
160-40665-22	HPPG-ESU-TU099B-022	Total/NA	Solid	Fill_Geo-21	491164
160-40665-23	HPPG-ESU-TU099B-023	Total/NA	Solid	Fill_Geo-21	491164
160-40665-24	HPPG-ESU-TU099B-024	Total/NA	Solid	Fill_Geo-21	491164
MB 160-491421/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-491421/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-40665-24 DU	HPPG-ESU-TU099B-024	Total/NA	Solid	Fill_Geo-21	491164

Prep Batch: 491424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-25	HPPG-ESU-TU099B-025	Total/NA	Solid	Fill_Geo-21	491164
160-40665-26	HPPG-ESU-TU099B-B-001	Total/NA	Solid	Fill_Geo-21	491164
160-40665-27	HPPG-F-053	Total/NA	Solid	Fill_Geo-21	491164
160-40665-28	HPPG-F-054	Total/NA	Solid	Fill_Geo-21	491164
MB 160-491424/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-491424/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 493201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-40665-1	HPPG-ESU-TU099B-001	Total/NA	Solid	DPS-7	491158
160-40665-11	HPPG-ESU-TU099B-011	Total/NA	Solid	DPS-7	491158
160-40665-21	HPPG-ESU-TU099B-021	Total/NA	Solid	DPS-7	491164
160-40665-26	HPPG-ESU-TU099B-B-001	Total/NA	Solid	DPS-7	491164
160-40665-28	HPPG-F-054	Total/NA	Solid	DPS-7	491164
MB 160-493201/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-493201/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

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Job ID: 160-40665-1
SDG: GJ46599748

Method: 905 - Strontium-90 (GFPC)

Matrix: Solid

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Sr (40-110)	Y (40-110)
160-40665-1	HPPG-ESU-TU099B-001	94.8	92.7
160-40665-11	HPPG-ESU-TU099B-011	100	92.7
160-40665-21	HPPG-ESU-TU099B-021	99.5	90.5
160-40665-26	HPPG-ESU-TU099B-B-001	102	87.9
160-40665-28	HPPG-F-054	96.8	93.1
LCS 160-493201/1-A	Lab Control Sample	100	85.6
MB 160-493201/23-A	Method Blank	103	90.5

Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier